THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. CVIII. No. 2425.] LONDON, NOVEMBER 2, 1909. [61ST YEAR. PRICE 6d.

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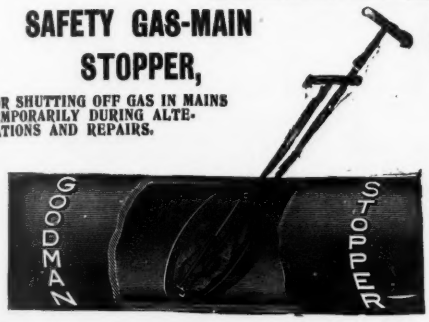

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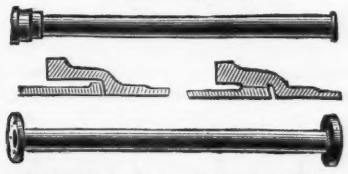

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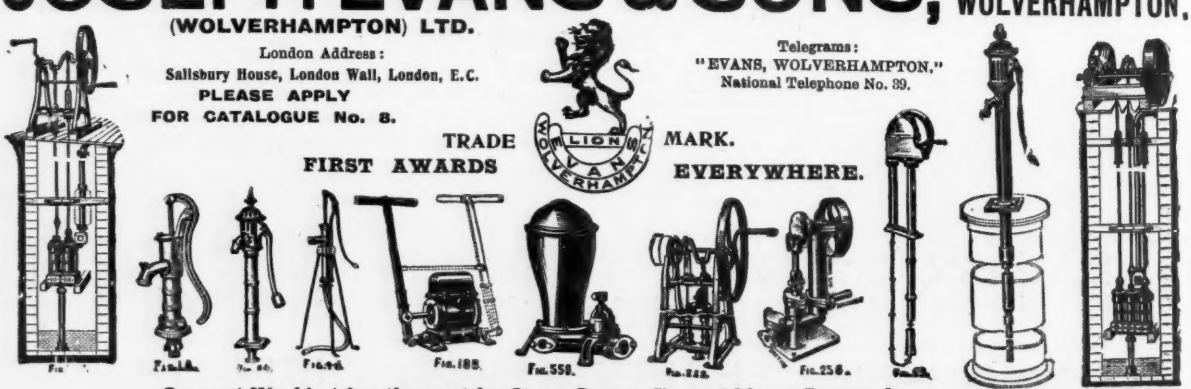

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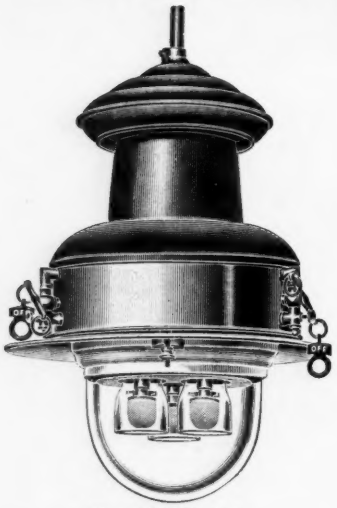

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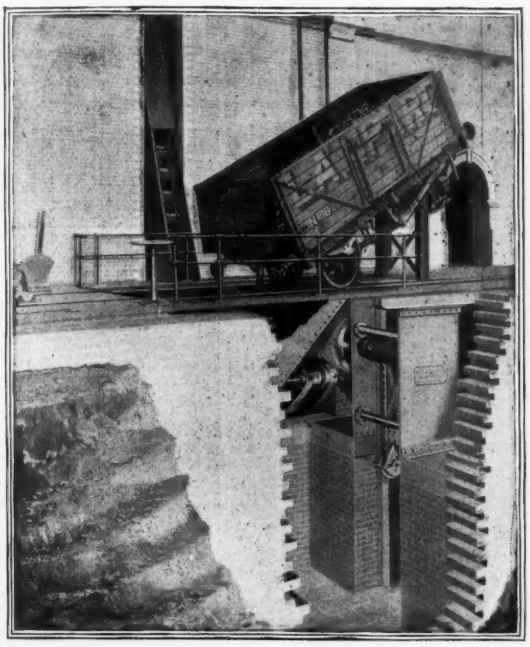

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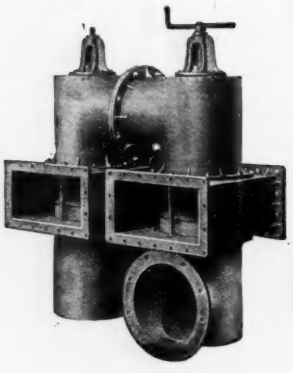

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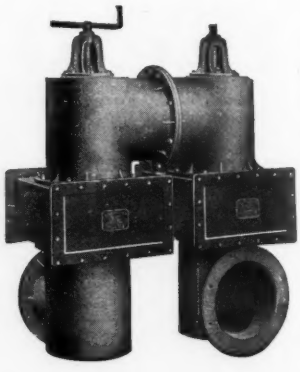

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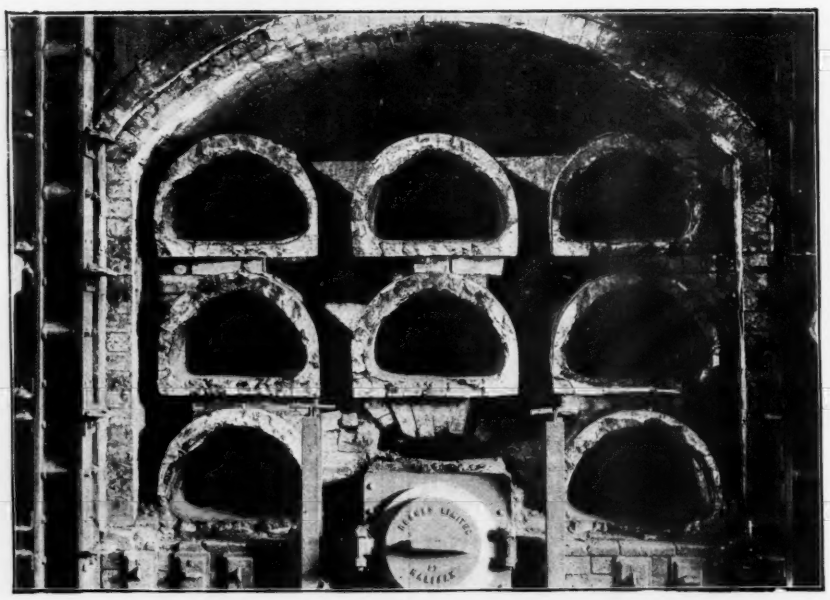

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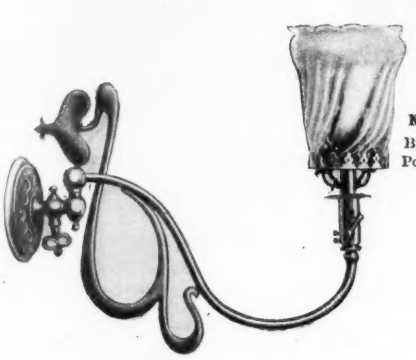

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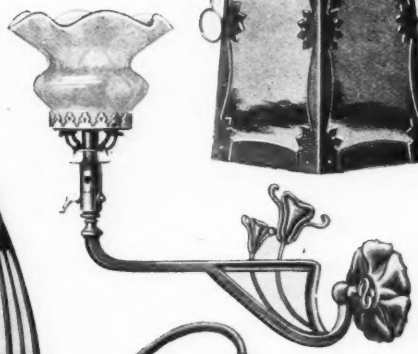

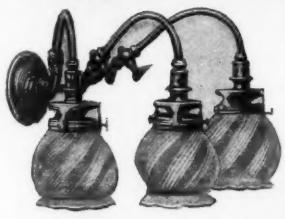

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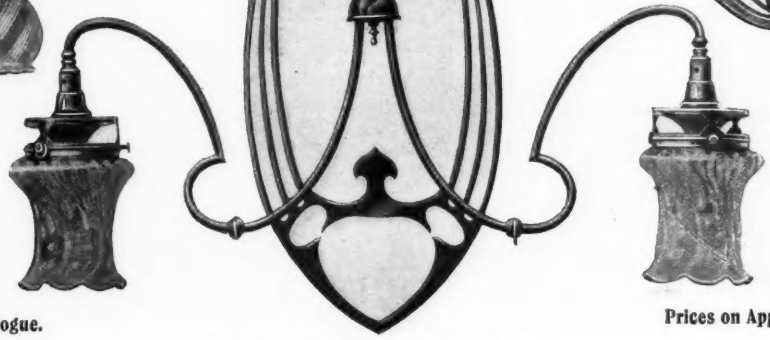

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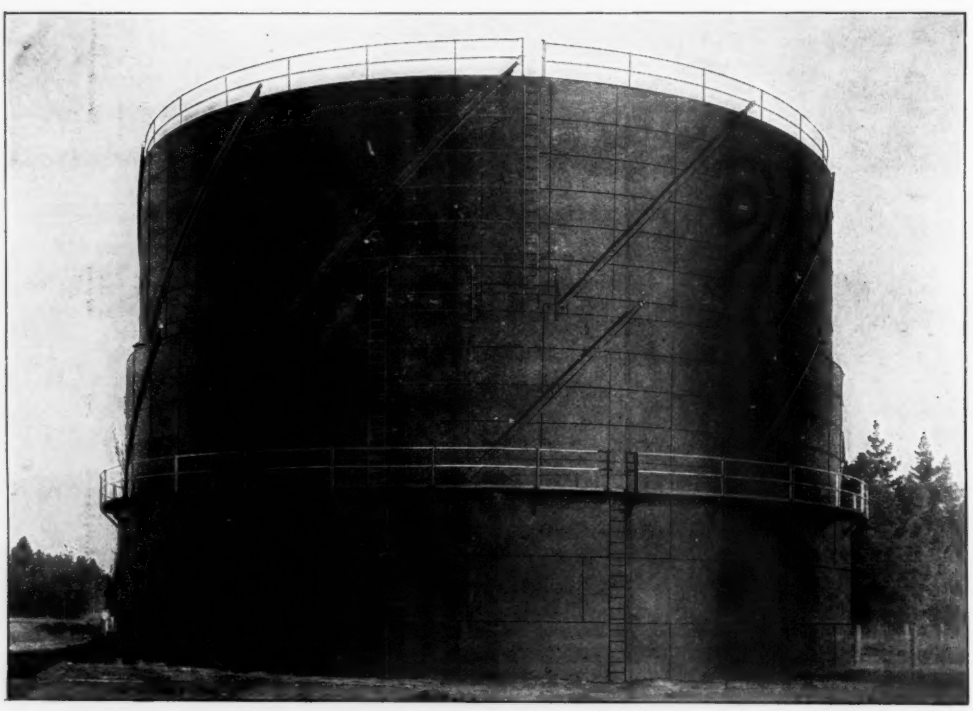

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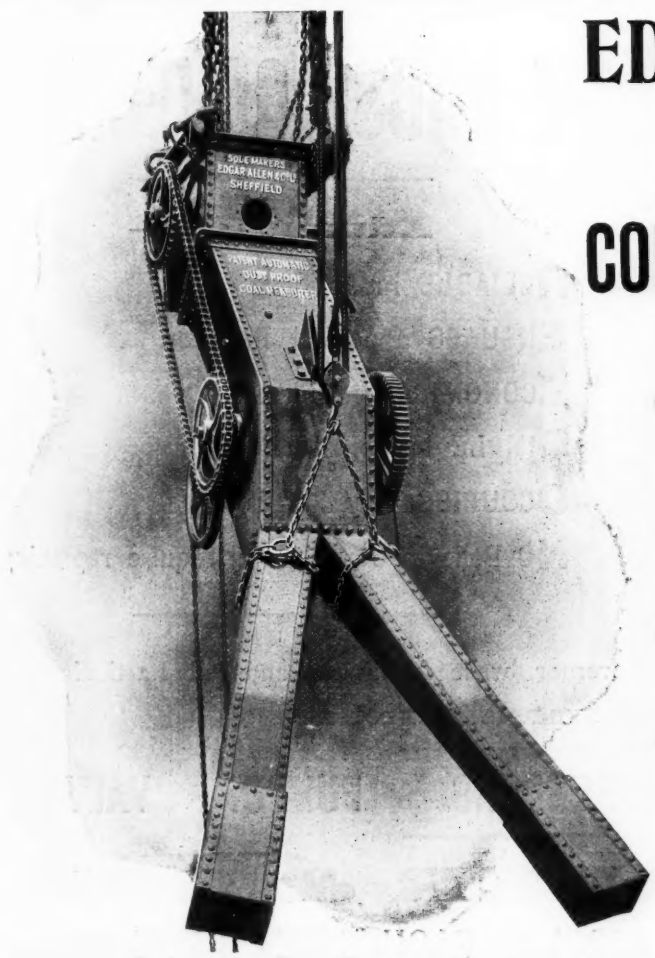

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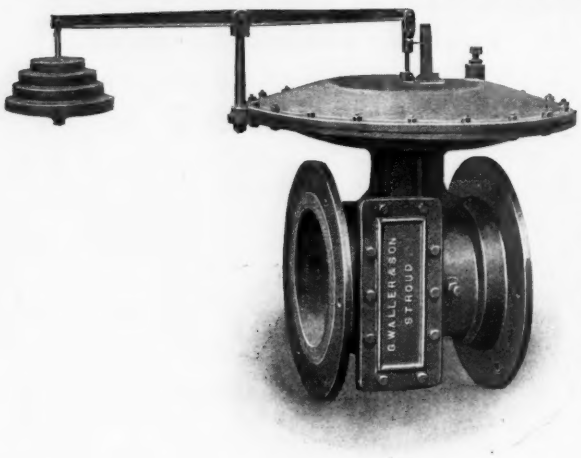

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EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON.

VOL. CVIII., No. 2425.—TUESDAY, NOVEMBER 2, 1909.

EDITORIAL NOTES—GAS, &c.

The Organization of the Gas Industry.

"Is Better Organization Needed in the Gas Industry?" was the title of an editorial article that appeared in the "JOURNAL" for July 20 last. Privately, many answers in the affirmative have come to us; but the answer especially desired is that which has now been given by the, *pro tempore*, responsible head of, and therefore the most influential man in, the professional gas organizations of the country. When speaking at the meeting of the Midland Association (*ante*, p. 252), the President of the Institution of Gas Engineers, Mr. James W. Helps—who by-the-by has been devotedly assiduous in his attentions to the affiliated District Associations—confessed that he was not at all satisfied with the present organization of the gas industry. If anyone in the professional ranks is capable of forming fair judgment on this matter, that one is Mr. Helps; for no man has had more intimate connection with the inner workings of professional organization in the industry than he, no one has better acquaintance with the difficulties of which public display is not made that compass about the organized bodies, and no one has better knowledge as to the limitations from which all such organizations—and particularly the Institution—suffer. Therefore to have the confession of dissatisfaction from the President is the first step towards reform; the second is to produce a widespread desire to bring about reform. If we correctly construe the remarks of Mr. Helps, anxiety in the matter is already existent among members of the Council; and, what is more, there is adumbrated in the President's mind a fully representative organization for the industry. The President's observations on the point appear to herald what may be a change fraught with so much importance to the industry that it may be of advantage to give them the prominence of reproduction here:

> **He might mention that one great thing they were anxious to do was to organize the industry in such a way as to have a representative body which could take up such questions as they had been discussing that day, and not have them left to be dealt with by outside organizations on their behalf. He confessed that he was not at all satisfied with the present organization of the industry; and he hoped during his term of office to be able to make a suggestion which, if taken up, would increase the usefulness of the Institution.**

In our opinion, in no way could Mr. Helps signalize his year of office better than by making a suggestion, and working to effect its consummation, having for its purpose the amending of that which is palpably defective. We need not again to-day traverse the ground of argument to be found in the article in our issue for July 20. But this we do say, that the enlargement from professional to industrial usefulness of the Institution can only be effected by an extension of its constitution. As a professional or technical body, the Institution is (within, true, somewhat sharply defined limits) an effective body; as a representative industrial organization, it is an ineffective body, and has no present title to be regarded as representative industrially. There is no getting away from this. As pointed out in our former article, the modern history of the industry supplies incontrovertible evidence of this being so.

It may be said that it is not long since the old Institute and Institution were in the melting-pot, and a united organization ensued; and it may be asked why this extension was not thought of then? The question is a very fair one; the answer is not at all difficult. At that time, the industry was not so strongly possessed as it is to-day with the importance of the closer and deliberately wrought union of science with the every-day work of the industry, such as has eventuated, after great effort, in the concrete association between the industry and the University of Leeds; then the competition between the gas and electricity industries had not reached the stages of severity that now obtain, not so much through the increased efficiency of electricity as through undue municipal preference and support; the residuals markets were not then threatened so acutely as they are now by the bye-products of the recovery coke-ovens (see *ante*, p. 97); further, the notable changes that have been, and are still, occurring in the industry had not advanced to their present stages. Events affecting the industry have indeed been moving very rapidly; and technical or professional organization alone does not suffice for the needs of to-day. In dealing with all matters other than those of technical inception and moment, the Institution are handicapped in effective movement solely through constitutional limitations; and even in the technical work, there is a somewhat rigid bounding through financial considerations. As suggested before in these columns, this all points to a new section in connection with the Institution being essential to the work of the times—a section in which the administrators of the gas supply industry can be organized, and in conjunction with which, without touching the technical work of the Institution, periodical conference on administrative and commercial matters could be arranged. Only bring about, on common ground, the direct union of Chairmen and members of Boards and Gas Committees with the general work and the requirements of the industry, and the confining chains to the competence and ability of the Institution will be greatly lengthened, to the advantage of the whole industry. We are not aware of the lines of the suggestion the President will make in due season; but, whatever may be done in the result, if it produces an effective expansion (estimated industrially) of the scope in value and vitality of the Institution, it will be a worthy memorial to his presidential year.

Protective Work.

THE Gas Companies' Protection Association is one of those bodies whose activities are usually carried on in such a manner that, if the curtain were not lifted once a year, the organization would be largely lost to view, except to those constituting the membership. The report that the Committee presented at the annual meeting on Thursday, and the amplifying speech of the Chairman (Mr. H. E. Jones), indicated a pretty large range of subjects that have occupied during the year the attention of the Committee and the Secretary (Mr. F. E. Cooper)—the latter more especially on legal points. The Association serves as a kind of agency for the members, a source of information, and, through it, a sharp look-out is maintained for all matters that affect in any way the interests of gas companies. There is also through it collective participation in appeal and protest. But it cannot be expected that success will always ensue from its operations. If it did, here would be a body to be greatly feared.

The Association did its part in warning the Government as to what would be the effects of the Coal Mines Eight Hours Bill. Neither the Association nor any of the other protesting bodies and industries fathomed in anticipation the full depths of mischief that the Act would produce. But the Home Secretary, receiving protests willingly and urbanely, displayed the same characteristics, when the door was closed upon his visitors, in setting the protests on one side as being of no account. One suggestion may be interjected here; it is that eyes should for a period be kept carefully on Northumberland and Durham. In the matter of the universal application of the test-burner, too, the work that the Association did in conjunction with the Institution has so far proved abortive, and has resulted in a promotion (as seen elsewhere) of less pretension, but of great value. Officially, the Board of Trade have shown apathy in the matter; but unofficially it is understood that they cannot move in it. We take it that in the address of Mr. Jones at the meeting, he was intentionally throwing light upon the position when he said: "It was clear they had called upon the Board to do "a little more than they could do, without at the same time "bringing in a further measure for the rectification of the

"Gas-Works Clauses Acts, which probably might not have "suited the members." We do not like the last few words. They appear to suggest that there is something to fear. If rectification of the Gas-Works Clauses Acts is desirable (and most of us admit that for many reasons it is), then the desirability should be allowed to stand before anything else. There are these constant hints as to some cryptic evil accompanying amendment, and yet no one is in a position to shadow out, much less put into material shape, what these evils will be. Find out whether they are evils or otherwise, or purely imaginary; and when the knowledge is available, then we shall know whether rectification or the *status quo* is the better. At any rate, no amendment of the General Acts would be effected without the fullest inquiry. But we do submit that the gas industry ought not to be handicapped in the matter of its legislative facilities without gaining some more exact knowledge than exists as to where the industry actually stands in regard to what is expected of it, and what, if anything, would be the price of amendment.

It is clear, from the report of the Committee of the Association, and from the remarks of the Chairman, that a certain paper that was read before the Midland Association a week before the meeting under notice does not represent the views that have general currency in the gas industry on the subject of the disallowance of depreciation in assessing for income-tax. A principle such as is proposed is a serious matter; and it cannot be permitted to become established without putting to trial its title to validity. The advice of the Committee of the Association is resistance to the Inland Revenue intentions until the larger companies have had opportunities of testing the question to a definite conclusion. Meantime, the Committee of the Association will keep a watchful eye on the question. It would, however, have given backbone to the smaller companies in their resistance to this new species of financial oppression if there had been some suggestion of united action. Another piece of work that, with proper assistance, will develop, is the attack the Committee of the Association contemplate making on unfair rate-aided electrical competition, and the loose charges made for electricity, especially by municipal authorities conducting such competition. The Committee want the active support of gas companies in furnishing them with as much evidence as possible on the subject, so that a strong case may be formulated.

Joint Bill for the New Test-Burner.

Strongly supported by influential Companies, the first step has been taken in the promotion of a Joint Bill for the adoption, by Companies who enrol themselves as participants, of the "Metropolitan" No. 2 burner as the standard instrument for testing the illuminating quality of their gas. The conference convened for Thursday last by the Gas Companies' Protection Association, under whose auspices the Bill is being promoted, was attended by a larger number of representatives of Gas Companies than there has been at meetings of the Association for some time past; and this is significant of the interest and importance generally attaching to the movement. As the Chairman of the Association (Mr. H. E. Jones) pithily put it, this is "a common cause," and a cause that is common must necessarily attract general attention. We have been at the parting of the ways now for some time in the matter of gas supply. The uses of gas have expanded and multiplied, and the old essential quality is not the essential quality to-day. Everything possible that is effective in assisting the industry, even in respect of the proper valuation of the gas supplied, must be done for the sake of progress in the right direction. Some of the burners named as standards in Acts of Parliament are monstrosities for the purpose; and the hypothesis has become extinct that the for many years ordinary burner, which was the best one known prior to the advent of the "Metropolitan" No. 2, is suitable for gas other than of the illuminating quality for which it was specially constructed. To obtain uniformity of standard, the present process of individual application to Parliament or to the Board of Trade is a tedious one. The Government, however, are much too occupied to give attention to any general legislation on the subject; and indeed unofficially (as mentioned elsewhere) it is learned that the Board of Trade are not prepared to move in the matter at present. Therefore the mode of procedure proposed by the Gas Companies' Protection Association is the next best that can be devised to bring about more rapidly the uniformity that all but a slender minority believe to be advisable.

Now, then, is the time for gas companies who have not yet obtained the right to have their gas tested by the burner that has been so widely scientifically approved, and consistently accepted by Parliament and the Board of Trade—by the parliamentary authorities to the extent of specifying it in the model clauses—to join hands with those who have already signified their intention of being included in the Joint Bill. But those companies—whether members of the Association or not—who intend to co-operate should communicate their willingness at once to the Secretary of the Association (Mr. F. E. Cooper), at the offices at No. 5, Victoria Street, S.W. Early intimation is of the greatest importance. The terms on which there is to be this joint application are reasonable. The original proposal of an initial fixed contribution of £50, has been reduced to 20 guineas, with a *pro ratâ* (according to volume of gas sales) responsibility for the balance of the expenses later. United action of the kind works out cheaply for the individual companies who have no other immediate necessity for approaching Parliament; and the terms and the opportunity should more especially appeal to the smaller gas undertakings. A Committee of strong constitution—including the Chairman of the Association, the President of the Institution of Gas Engineers (Mr. James W. Helps), though not in that official capacity, and Mr. Charles Carpenter, the inventor of the "Metropolitan" No. 2 burner—has been appointed to see the measure through; and the Committee, as at present composed, have power to co-opt anyone else whose services, in their judgment, may be of any special value.

Everything looks favourable for success; and really we cannot see grounds for anticipating anything else. The confidence of the promoters is seen in the very act of initiating the movement. What Parliament has done, *without exception*, during the years that have elapsed since the introduction of the new test-burner, in every individual case that has come before them—company or municipal authority—they, assuredly, will not refuse to do because a number of companies collectively ask them to do likewise. The precedent is too abundant to allow of any refusal. There will be general endorsement of the Chairman's advice that the local authorities in the districts supplied by the Companies joining in this promotion, should be informed at once of the intention to do so, and that full explanation as to purposes and advantages should be given them. The point especially should be impressed as to the complete and consistent ratification by Parliament of the adoption of the new standard burner in the case of both municipal and company gas supply; and, moreover, mention should be made of the fact that there are instances where, the old test-burner having been proposed in Bills in recent sessions, the parliamentary authorities have, during the progress of such Bills, made the test clause comply with the new model one, and so, in this way, have done something towards bringing about the uniformity of standard burner and conditions that is desired by the industry. Opposition, in our opinion, under the circumstances, will be futile. The success of the joint Bills in connection with the sulphur clauses should also serve as an inducement to participation in the present movement. But let us again emphasize this, that it is imperative there should be immediate decision and communication with the Secretary of the Association. Procrastination will put companies on the wrong side of the pale of this favourable opportunity. Those who determine to avail themselves of the opportunity will find themselves in good company. Up to last Friday, seventeen Companies had entered for participation in the promotion; and these Companies represent an annual gas production of about 15,000 million cubic feet. Others, too, are on the point of determination. Those who fear that some onerous exactions will be made, entertain a view that is not shared by us. Should any undue imposition threaten in any case, there can be immediate withdrawal.

Some Unique Experience, and Reconstruction Work in Melbourne.

The article Mr. P. C. Holmes Hunt, the Chief Engineer of the Metropolitan Gas Company of Melbourne, contributes to our columns this week is particularly interesting from two aspects—the one is the almost romantic, at any rate, unique experience that the figures in the introduction supply; and the other is the absolutely up-to-date carbonizing equipment at the South Melbourne works that Mr. Hunt has been instrumental in installing. The descriptive story that he puts before his colleagues in this country seems, through

the line to line character of new plant there and here, to do much to bridge the space between him and them. But first as to the figures in the two opening paragraphs. They bear a tale of rapid declension and recoupment in the business of a gas undertaking that is, we opine, without parallel in the history of the world's gas industry. Here is an undertaking that in 1891 was doing a business in gas to the amount of 2,136,631,000 cubic feet, and six years later (owing to the momentous trade and financial crisis through which the country passed) that magnificent business had crumbled away, by upwards of 45 per cent., to 1,167,900,000 cubic feet. The Company's return to more prosperous conditions has accompanied the turn in the tide of the country's affairs. The recuperative power of the concern is best seen when it is mentioned that the loss of 968,731,000 cubic feet per annum which the foregoing figures show, had been reduced to 375,840,000 cubic feet by 1908. At the present rate of increase, it is expected that the old position will be completely restored in a very few years. It is a remarkable experience; and the strength of the Company must have been great to have withstood such a tremendous shock.

Meanwhile, a considerable part of the plant was standing idle; and during those years was degenerating and, through the advances in carbonizing practices and plant, losing cast in point of economical ability, as judged by the modern standards. The position was one that added greatly to the ordinary responsibilities of the Engineer; but upon this head Mr. Hunt is modestly silent. It is easy to picture the undescribed position. Directors and Engineer, however, have adopted a spirited policy in putting themselves, with a refluence of business, in possession of economical gas producing plant. Its character, apart from the descriptive article, there is no call to specially mention here. For horizontal working in every particular—in structural features and ancillary devices—it is up to line with the best plant and practice in this country. Mr. Hunt has adopted De Brouwer projector charging and pusher discharging; and the economical considerations that weighed in his choice are stated. Single ascensions have been adopted; and in twelve months' working there have been only three stopped pipes. But tar towers and Cowan's governors are employed. The material-handling plant is of a kind that has the recommendation of considerable experience. A novel feature is the Engineer's own design of travelling platform and coke-shoot, which is a convenience in several ways and a saver of labour. We will not detract from the interest of the communication by further specifying the plant. But in considering the question of capital costs, readers will bear in mind the distance much of the plant had to be shipped, the higher wages for labour in Australia than in England, and the extensive character of the plant that the capital cost includes.

The Company and their Engineer are to be warmly congratulated upon their enterprise; and what they have done shows that, in these large works so far from the Mother Country, it is intended that practices shall follow, with the exercise of discrimination, close upon the heels of advance in countries where the opportunities for progress are greater. Much other reconstruction and extension work looms ahead. Already Mr. Hunt is asking himself, Shall the next system be horizontal retorts for heavier charges, or vertical retorts, or carbonizing chambers? In this respect, thought at the far ends of the earth synchronizes with that at home.

St. Helens Verticals under Inspection.

It was extremely good of the President of the Manchester District Institution (Mr. J. W. Morrison) to forego the pleasure of receiving the members at Sheffield (though his Company would not relinquish their privilege of entertaining them) on Saturday, in order that they might have the earliest possible opportunity of inspecting the exemplification at St. Helens of the system of continuous carbonization in vertical retorts that has been developed in their very midst by the concerted work of Mr. Samuel Glover and Mr. John West. The names impart a home interest to the system; and the numerous gathering of engineers who inspected the installation, by the courtesy of the Chairman (Mr. James Crooks) and members of the St. Helens Corporation Gas Committee, were fully satisfied that their colleagues have produced a practical system, that it fully answers claims, and that it has come to stay to take an important place among other successful advances in gas manufacturing operation. Carbonization is not only a burning question, but it is an incandescent one at the present time; and every gas engineer feels himself bound to keep himself as fully *au courant* as possible in all matters affecting it. Thus it was noticeable that most of the members—through the published descriptive articles, with the records of tests that have been made by independent workers with different coals, and through the exceedingly informative and creditably prepared *brochure* that the patentees had distributed among them—were well-primed before their visit with what they were going to inspect in actual operation and with the working performances.

The objects aimed at, and successfully embodied by joint labour in the setting, and the attendant successes in every respect, were also succinctly stated by Mr. Samuel Glover in a paper that he read at the business meeting held during the visit. The objects and successes make a substantial list. Among the capital ones are: Continuous charging and discharging, simplification of the process of carbonization, reduction of mechanical operation, increased output of gas per retort and make per ton, control of the rate of carbonization, control of the heating of the setting, fuel economy, improved heat efficiency, recovery of heat from the spent coke, improved labour conditions, saving in costs, enhanced quality of coke, increased yield of ammonia, avoidance of stopped pipes, reduction of naphthalene, and saving in ground space for a given production. There are some other advantages of minor importance; but this list gives such material benefit that the others can be here ignored. On looking at the list, it is obvious that in considering the relation of vertical retort working to the older systems, it is a mistake to limit oneself to the make of gas only. The collateral advantages are also material, and valuable. In fact, the vertical retort system appears to have produced an unbethought-of alliance of manufacturing economies.

Supplementing the comprehensive tests by Dr. Colman and Mr. J. E. Blundell already published, Mr. Glover gives in his paper the results of a thirty days' test with the local washed nuts and fine slack that are purchased for their cheapness (cheapness as adjudged by the final financial result) and availability. It was a pity that the season did not permit of a corresponding simultaneous test in the horizontal retorts; but the average increase with the verticals of 1200 cubic feet per ton in make of which Mr. Glover speaks is a substantial gain that alone is worth attention. Multiplying it by the annual coal tonnage of the works, the financial advantage in gas revenue and saving in working expenditure would be considerable. Looking into the working costs quoted in the second table in the paper, the fact that they refer to a setting of only eight retorts will not be overlooked. There will be a considerable depression in the costs per ton and per 1000 cubic feet, when additional settings are at work, as is seen by the calculations in the third and fourth tables. Points that, from outward observation, particularly struck the visitors on Saturday last were the simplicity of the charging arrangements, the confining of mechanical operation to the discharging of the retorts, and the extraordinary reduction of the temperature of the coke before being finally removed from the setting, by the extraction of the heat by the secondary air.

Gas-Works and Railway Charges.

The appeal of the Corporation of Birmingham to the Court of Railway and Canal Commissioners (constituted of Mr. Justice Lawrence, the Hon. A. E. Gathorne-Hardy, and Sir James Woodhouse) for relief in respect of a number of matters affecting the traffic to and from their gas-works has ended in a judgment that, on the main issue, is adverse to the Corporation; but in the total result, through concessions and admissions as to excess charges that the investigation has been the means of producing, has fully justified the Corporation in the action they took at the instance of the Gas Committee and the Chief of the Department (Mr. G. Hampton Barber). The judgment does not reveal, in their entirety, what those gains are; but it is sufficiently clear that, in the aggregate, they will amount to a substantial sum. For instance—taking one point only—it was proved to the satisfaction of the Railway Companies that they had been charging more in respect of outgoing coke than they were entitled to; and, as Sir Alfred Cripps pointed out during the protracted proceedings in March last, the Corporation, in respect of those charges that had been illegally made, would be entitled to an account for six years past. So that there are some gains that are retrospective, as well as present

and future. More information as to excess charges can be readily extracted from the judgments—particularly that of Sir James Woodhouse.

Inasmuch, however, as the investigation referred to three large Railway Companies, to four gas-works, and to an incoming traffic of 650,000 tons of material a year, and an outgoing traffic of 120,000 tons, it is patent that the matters under review make a somewhat complicated whole, and that very little in the way of general principles can be gleaned from the proceedings or judgments that will be commonly applicable. In connection with works' sidings, and the questions of accommodation and terminal charges, the conditions are so varied between works, that—unless there is clear evidence of excessive or illegal charge, or without mutual agreement—there is much perplexity, and no simple rules can apply. And, naturally, where there is no competition, there are railway companies who do not look with any benevolent eye upon traders who have sidings, and who are dependent upon them, though far be it from us to suggest that they deliberately overstep the bounds of legal charge. This Birmingham case, however, shows that what is legal is subject to a good deal of individual adjustment, depending upon the position of the sidings, the accommodation afforded for free entry and removal, and the relative service rendered by the parties. It was on questions of this sort in connection with Saltley and Nechells—these stations constituting the main centres of dispute—on which the Corporation failed. They claimed private siding allowances or rebates on the ground that they rendered certain services to the Railway Companies at these works; while the Companies submitted that, on the contrary, they had not always free access to the Corporation sidings, and that, for the practical working of Saltley and Nechells, considerable use had to be made of the Railway Companies' sidings—"service reservoirs" Mr. Justice Lawrence aptly termed them—for accommodation, for regulating the traffic, and for sorting outgoing trucks. The Court held that the Railway Companies did render a service not incident to conveyance, and which was due to position, area, and configuration of the works, and the large volume of traffic in and out. Though there was failure on this point, the Corporation, it will be seen, had clear ground for dissatisfaction on others; and they acted wisely, while these matters were being investigated, to have the whole position overhauled and clearly defined and regulated, to put an end to continual dispute.

In view of the position in point of magnitude of the Birmingham works, the fact that three Railway Companies were concerned in the dispute, and the eminence of learned Counsel engaged in the appeal, the evidence was published at considerable length in the second volume of the "JOURNAL" this year, in the belief that it will be suggestive to other administrators of gas-works which have private sidings in investigating the rates and charges levied in respect of their incoming and outgoing traffic, and the questions of consideration for special services rendered either by the gas undertaking or the railway company.

How to Increase Wages.

So much has been heard of late with regard to Socialistic doctrines as a cure for all the ills that Labour suffers from, that there seems to be some ground for fearing that other suggested remedies than those which fall within this particular category may be lost sight of by a large proportion of the working classes. Perhaps there is in reality no justification for any fear of this kind; it is a matter that time must be left to reveal. Meanwhile, it is pleasant to see that, for those who will heed, there is no lack of other suggestions for benefiting Labour. As a means of improving the relations between employer and employed, profit-sharing is now well-tried, and has been found highly successful; but what about increasing the employment the profits resulting from which might be shared? Would it not be worth while for workers generally to make up their minds to try the method of adding to employment and wages by adopting the course suggested by Mr. Robert Stubbs, when presiding over the seventeenth annual congress last week of the National Free Labour Association? His view is that there is only one way to increase wages as a whole—to avoid strikes and legislative attacks on employers, and so tempt larger masses of capital into industrial enterprises. This is a proposal for the carrying out of which no elaborate programme of social reform is needed, and the simplicity of which is its recommendation. That the Trades Unions might, in times gone by, have done much more in this direction than they saw fit to do, admits of no dispute by students of industrial history; but there has lately been a good deal of evidence that the leaders of these organizations are prepared to discuss questions between employers and their men in a much more reasonable manner than heretofore. Here is what Mr. Stubbs had to say to militant Trades Unionism: "Trade Unionism destroyed initiative and fostered hate. It separated the employer from the employed, and placed an injunction upon progress. It perpetuated distrust and organized enmity, and created a system of suspicion. Trade Unionism did not strive to get the work done; its intent was to make it last. Twenty years ago Trade Unionism, unrestrained and militant, was rapidly controlling our national industries. But a change had now come over public feeling." Dissatisfaction with Trade Unionism apparently led to the formation of the National Free Labour Association, who now claim to represent nearly three-quarters of a million of free labour wage-earners. With so much success behind them as this, it is not surprising that the delegates should have passed a resolution declaring that the time has arrived when employers of labour and non-Union workers should enter into closer relations for mutual support and assistance "in order to counteract the aggressive action of militant Trade Unionism."

The Ticehurst Muddle.

The further the shareholders of the Ticehurst Gas Company go in the investigation of their affairs, the deeper they get into the mire, and the clearer it becomes that they are the victims of a well-organized befooling scheme. They met last Tuesday, but went away from the meeting sadder, if not wiser, men. A firm of Auditors (Messrs. Archer and Capes) who had audited the Company's books reported that they could not find receipts or invoices, that no distinction was made between capital and revenue, that no proper record had been made of receipts for residuals, that account collections had been carried out in the most haphazard way—in short, reading their report, it would appear that it was nobody's business to properly conduct the affairs of the Company, but that it was everybody's business in a position of trust to so confuse everything that the shareholders could not possibly find out their exact position. Mr. George Capes is, or has been, associated with a number of companies which have not commended themselves to us as good investments. It is understood that he is connected with the firm of Auditors who reported upon this Ticehurst chaos. The Chairman of the meeting was Mr. W. B. Martin and a colleague is Dr. White, both names with common association with Eaton schemes—the former, for example, with the Amman Valley and Laindon Companies. No meeting of the Ticehurst Company has been held (until this one) since 1904, and no accounts have been issued; and yet Mr. Martin, as coolly as possible, stated that it is doubtful whether the Directors have material at their disposal to comply with the requests of Mr. C. S. Glover and his fellow shareholders for information. Mr. Martin and Dr. White cannot be allowed to shake off their responsibility in the easy manner the former seemed disposed to do at the meeting; and the shareholders were wise in refusing to at present accept their resignations. There are explanations and acts of commission and omission to be accounted for in a manner somewhat different from that which was considered good enough for the shareholders at this meeting. Eaton seems rather clever at leaving his old associates, at the proper time, to face the music; and they face it badly. But an absolute callousness appears to be a common characteristic. It was denied by the Chairman that £67,000 had been spent on the works; but he confessed to £34,750 having been the amount of two contracts, while another shareholder mentioned that £58,000 was referred to in the statement as having been spent upon work carried out. There is no getting at the truth. The total value placed on the work carried out (at the water-works and the Ticehurst and Wadhurst gas-works) by an engineer consulted by Mr. Glover is £15,552. So where has the sum gone to that represents the difference between value and expenditure? The meeting does not seem to have thrown much new light upon the position, beyond confirming the story of the absolute muddle in which the Company's affairs are, and the indifference and neglect of those in whom the shareholders were, by the artifices of Eaton and his confederates, induced to put their trust.

A New Promotion.

As we expected would be the case when the Bungay, Harleston, and Eye Water Bill was before Parliament this session, seeing that the name of a well-known professional promoter—Preston—was connected with the measure, a Company is being floated and a prospectus has been issued. These promoters do not lose time in turning into money the powers given them by Parliament. Parliament gives them property that they sell to the public—at a price; and therefore Parliament fills the useful, if undignified, position of being a pawn in the professional promoting game. The Unopposed Bills Committee of the House of Commons (see "JOURNAL," June 15, p. 715) were dissatisfied with the evidence adduced as to Bungay and Harleston, though looking more favourably upon Eye. There was also, in their opinion, a deficiency of evidence regarding the sources of supply. The deficiency is continued in the present prospectus, the most eloquent parts of which are the omissions on vital points. It is mentioned, for instance, that contracts have been entered into for the construction of the works; but it is not stated who are the contractors. If we were asked to make a guess, the reply would be the Finance and Construction Corporation. Perhaps the Engineer (Mr. Gerrard H. Perryn, Assoc.M.Inst.C.E.) will give us the information, as we are not likely to get it from Mr. Preston or any of the Directors. The Directors are Charles Wheeler, George Capes, and Frederick Miller. The name of Capes has appeared in connection with the Bude Gas, Brockenhurst Gas, South Lincolnshire Water, and Mid-Oxfordshire Gas Companies. The name of Charles Wheeler has been associated with the Mid-Oxfordshire and North Sussex Companies. The Mid-Oxfordshire Company's Bill was ejected from St. Stephen's (not St. Stephen's Chambers) on financial grounds—a Committee on inquiry being dissatisfied with the proposals. The matter stands fully recorded in the "JOURNAL" columns. With regard to this little Bungay matter with its big capital, it is described as a "sound home investment." That is a matter of opinion; and our opinion is of a somewhat contrary nature to that suggested by the prospectus. The total authorized share capital of the Company is £25,000, of which the Directors want to get £18,000 in hand in the next two months. The authorized debenture capital is £8300, of which the Directors are asking the public for £6000. Here is a little Company whose works do not appear to have been started yet; and already the Directors are requesting the public to part with £24,000! It will take time to construct the works; and then, in order to pay 6 per cent. upon the ordinary shares and 5 per cent. on the debentures, assuming the promoters succeed in getting the present issues landed on the public, a clear profit of £1380 per annum will be necessary. The chances of getting this are remote. The customary bait of 6 per cent. interest on the ordinary shares is offered. The "contractors" are going to pay this. It would be interesting to see a copy of the contract; but those who desire to do so must go to the Bungay offices. Why could it not have been on view at a more convenient address—say, at Tokenhouse Buildings or St. Stephen's Chambers?

Gas Turbines.

Some six years ago Mr. E. Kilburn Scott, Assoc. M.Inst.C.E., predicted that "the gas turbine will make its appearance." It was a bold assertion then; but it is less so now. His confidence is unabated. The progress made in large power gas-engine construction has been tremendous; but between such engines and the high-speed gas-turbine, there is a field over which investigators are roaming in a sort of haphazard way, in the hope of hitting upon the correct lines for the creation of an efficient gas-turbine. Experiments are being made; but Mr. Kilburn Scott thinks they require co-ordination, and that this must be done before any settled progress can possibly be effected. His suggestion, we gather from an article in a contemporary, is that the engineering trade should combine, and have the matter thoroughly investigated by gas experts. He suggests that the Royal Society and the Institutions of Civil, Mechanical, Electrical, and Mining Engineers should form a Gas-Turbine Committee, start a fund for the purpose of investigation, and commence research at an early date. The gas-engineering profession is strongly represented in the membership of the Institution of Civil Engineers, but why does Mr. Scott omit mention of the Institution of Gas Engineers? Has he never heard of this body, whose history runs back to 1863?

GAS STOCK AND SHARE MARKET.

(For Stock and Share List, see p. 349.)

THE Stock Exchange had a much better time on the whole last week, but not without some little perturbation. The tightness of money and the question how the settlement was going to be got through, oppressed minds; and when the way ahead was seen to be clear, there was evident relief. The opening day was fairly cheerful; the air having been to a great extent cleared by the liquidations of the previous week. Consols advanced ¼. Railways were rather better, and there was a recovery in the speculative lines. This tone lasted into Tuesday, and a hopeful feeling in reference to the settlement confirmed it. But this gave way before the close, and a good bit of selling supervened. Wednesday was thoroughly depressed. Money was dearer; the weather abominable; and things in general uncheering. There was no great fall in prices, but markets sulked. Thursday brightened up considerably as the settlement proceeded smoothly, except for two small failures not of devastating importance. Business was not large, but prices everywhere mended. Friday was quite a cheerful day, except in the Consols Market, and most of the rest improved; while the speculative lines were very gay. This condition of affairs continued on Saturday—a pleasant prelude to the closing of the Exchange until Tuesday morning. In the Money Market, there was a strong demand which enforced higher rates for short loans, and discount terms stiffened steadily. Business in the Gas Market was much quieter than the week before. Things were languid and listless, hardly a change in quotations taking place all through the week. In Gaslight and Coke issues, the ordinary was comparatively little dealt in, and the tendency continued weak. The best figure attained was 105⅜ on Tuesday, from which point it went weaker, and 104 was touched on Saturday—a fall of 1. The secured issues were quiet and unchanged. The maximum marked 88 and 88½, the preference from 104 to 104¾, and the debenture 85½ and 86½. South Metropolitan was steady, realizing from 120 to 121. Commercials were not dealt in at all. In the Suburban and Provincial group, Alliance and Dublin new was done at 12 11/16 and 12¾, Brighton and Hove original at 211½, British at from 42⅜ to 43, Ilford "A" at 138, South Suburban at 119½ and 120½, Tottenham "B" at 112½, West Ham at 124¼, and ditto preference at 128. On the local Exchange, Sheffield "B" and "C" were advanced to the level of the "A" stock. The Continental companies were very quiet, and were unchanged. Imperial changed hands a few times at from 180½ to 181½, ditto debenture was done at from 95 to 95½, and Union at 97⅝ and 98½. Among the undertakings of the remoter world, Buenos Ayres realized 13¼ and 13½, Cape Town preference 5⅝ and 5¼, ditto debenture 83, Melbourne 5 per cent. 100½ and 101¾, Primitiva 7¼ *cum div.* and from 7 to 7⅛ *ex div.*, and River Plate from 16¼ to 16 11/16.

ELECTRICITY SUPPLY MEMORANDA.

Revival of the Public Lighting Question—Defence of Ratepayers by the Local Government Board—Questions of Relative Interestedness and Prices—A Local Misconception—A Comparatively Small Sum—Purchasing a "Remunerative" Undertaking—Postulation.

IT will have been remarked, from references in the "Memoranda" recently, that in various towns there has been a fresh outburst of attention to the question of side street lighting by metallic filament lamps. But this increased attention is concentrated in places where the municipal authorities are the suppliers of electric current. The fact speaks volumes. The questions of efficiency, of improved lighting at lower capital and running costs by adopting the advances of another system, and of reliability, do not enter into account. They are matters—economic and otherwise—that are contemptuously set on one side under the new law of the ascendency in local government of municipal trading. The two sole arguments are that the private lighting peaks having had their points considerably levelled by the metallic filament lamp, street lighting by the same means should be established to reinstate those peaks; and that no matter whether to achieve this the capital expenditure be heavy, no matter whether the annual costs be more, no matter whether the central station supplies current to these street lamps at an unprofitable price, no matter whether the efficiency and reliability are less than the newest systems of incandescent gas lighting, the lamps are held to constitute a good advertisement. That is the position to be faced; and it is only by the Local Government Board and the ratepayers doing their best to preserve the independence of local government from the influences of municipal trading, that the unreasonable, preferential treatment of the municipal electricity undertaking at any cost will be even partially prevented. There are local authorities who dispute all right on the part of the Local Government Board to interfere in their choice of an illuminant—a choice dictated by the one consideration of municipal ownership. Nothing stronger than this is wanted to point the utter incompatibility of such ownership with the proper direction of local affairs. The Board have for years been trying to preserve a distinction between the two; and, as stated recently, fresh instances of this have been provided by Finchley, Yarmouth, and Gravesend, with the customary crop of resentment.

At each one of these places, the electricity undertaking is a

municipal possession; but the gas undertakings are not. The latter have the double interest of being exceptionally large ratepayers and competitors of rate-supported electric undertakings. But for them to utter a word of protest brings down a perfect avalanche of abuse, just as does a suggestion in the interests of a district upon the Local Government Board. The district papers are encouraged by the local governing interests to discount the suggestion of the Board by questioning the competence of that body, while in doing so they lay themselves open to the obvious retort that their knowledge of the matter must be particularly microscopic in contrast, through extensive experience, with that of the Board. And as to the position of the gas companies, their protests can be best emphasized by analogy. Suppose a municipal authority started a local newspaper of its own; and it was within its power to preserve all reports of the proceedings at meetings of the Council, all other local government intelligence, and all local government advertisements for its own venture, using, too, its influence through the members to obtain the same preferential treatment for the municipal newspaper from the other local bodies—such as the Board of Guardians, school authorities, and so on. Heavens! what a row there would be in the ordinary local press. The principles of municipal trading would be torn into shreds, and scattered by the torrent of censure from the outraged journalists. There would be a sudden stoppage of the servile talk in the local papers (as at Yarmouth now) regarding the great confidence of the ratepayers in their local representatives, and the ratepayers would be described as a "wooden-headed" lot for permitting their independence to be so absolutely alienated by the local Council. That term "wooden-headed," it may be said in passing, is not ours; it is suggested by a Yarmouth paper as being our estimate of the intellectual capacity of the ratepayers. Far from our thoughts was and is such an estimate. The indifference of ratepayers is not so much due to wooden-headedness as to a want of understanding of the entire position. It is because of this that the Local Government Board are duty-bound to do what they can to protect the ratepayers. At Finchley, Mr. Councillor Royston has this matter of public lighting in hand; and very fairly he says he "quite recognizes that it is the Local Government Board's duty to check extravagance of public bodies." There is indebtedness to him for this recognition; the value of which would have been increased had he after "extravagance" inserted the words "and mismanagement through preference." But it should be said that Mr. Royston's protest was against the delay of the Local Government Board in granting consent to a public lighting loan. Upon which it may be remarked that they are now waiting for information as to comparative costs that the Council are not disposed to give them.

It will have been gathered from the foregoing that the Yarmouth "Independent" and "Mercury" have had a turn at our comments on their unreasoned attack on the attitude of the Local Government Board in respect of the scheme for converting Yarmouth street-lamps to electricity; and they resent deeply our questioning of the superiority of their competence over that of the Board to judge of this matter. Those who sneer should not be offended if they are sneered at. We are not in the least annoyed at being called "interested," at being told that it is our business to run down electric light, nor at the suggestion that we are none too scrupulous, or at being misrepresented as having referred to the "Independent," as a "little squib of a local newspaper." We have a duty to perform; and it will be performed. Scorn is showered upon our interestedness; but totally ignored is the interestedness displayed by municipal championship in the local press, without giving due heed to the other side of the case. In taking counsel (as from observations made in our contemporaries we rather suspect has been done) with their municipal friends, the door of the Gas Company's Engineer has been deliberately passed by our local critics. However, our comments were published on Oct. 12; and it was not until Oct. 23 that replies were published; so that it may be assumed that the notes under review represent the best assisted judgment of our friends, In the result, we ought perhaps to feel ourselves totally eclipsed. but do not. As we read, it is borne upon us how in ignorance some people can be absolutely confident tools; and the confidence of our Yarmouth journalistic *confrères* only brings into stronger relief the ignorance with which they write on this particular question. The writer in the "Independent" abuses the title of his paper by being one-sided; the writer in the "Mercury" justifies the title of his paper by his vapid views on the subject in hand.

We are really pleased to see that the many cheap gibes at the Local Government Board have been toned down; but the defence of the Corporation's scheme is, if anything, now more curious than ever. It is not considered extravagant by the note writers in our local contemporaries that £10,000 to £12,000 should be expended in converting gas-lamps to electricity to swell the volume of business for (not necessarily the profits of) the electricity station, not —when all expenses direct and incidental are paid—at a cost below that at which modern gas lighting can be done, yet producing a light less efficient than the newest of gas-burners in illuminating and diffusive powers under the worst of atmospherical conditions, and a light the reliability of which falls far short of the character of safety possessed by gas lighting. Once get that £10,000 to £12,000 spent, and the ratepayers will be in this matter irretrievably in the hands of the municipal electricity department, no matter what happens. We have asked for the report of the local officials on the subject of this wholesale conversion, in order that it may be studied with the view to praise or adverse criticism. The report has not come to hand, though the officials in question ought to have been pleased to crush us by immediately forwarding it. Instead of this, one of the papers simply quotes certain annual costs without giving any descriptive information regarding the lamps, in order to enable judgment as to what those prices represent in the way of quality, and whether the lamps are the best for the purpose. Even the figures given are contradictory in the two papers. In the "Mercury" the annual cost of each electric lamp is stated as £3 3s., and of gas as £3 6s. 8d.; while in the "Independent," it is mentioned that the Yarmouth Gas Company offered to reduce their price to £2 19s. 6d. Candle powers are not given; but 3s. 6d. multiplied by the number of gas-lamps in Yarmouth is worth saving.

The writer in the "Independent" comes a cropper between his want of technical knowledge and his enthusiastic championship of the Corporation Electricity Department. He says that "when nearly two years ago the Corporation were in communication with the Gas Companies for the purpose of comparing the prices of gas and electricity, the Southtown Gas Company explained that it was wishful to retain the Corporation custom, not so much on account of the actual profit derived from the lamps as from the fact that the extra quantity of gas used caused a reduction in the cost of the whole production." "Just so," he triumphantly adds, "it is in our own electricity works." To the layman, the contention appears correct. There is, however, no comparison between gas and electricity in this respect. Gas is produced regularly throughout the twenty-four hours, and stored ready for use as wanted; gasholders providing the balance for all variations in demand. Electricity has to be produced as required. What is the result of this in considering this public lighting question? The public lighting falls on the peak of the private lighting load; and, in many places, it is only because of the effect upon the peak of the metallic filament lamp, that there is all this hub-bub about getting hold of the public lighting. The whole idea is to re-establish or increase the volume of the output of lighting units. But to do this by the means proposed, during the private lighting hours, does not necessarily imply that the addition of this particular load, spread over all the other units, will be an economic advantage to the central station. On the contrary, any disinterested electrical expert will aver that the units that form the topmost part of the day's peak are more expensive to produce than those that form the solid foundation. And let us point this out to the writer in the "Independent"—that, while these public lighting units, which come upon the foundation provided by the private lighting business, are relatively more expensive to produce than the private lighting units, the price paid for them is less, and must be less or the public lighting account would ascend to such mighty figures that there would be a great deal more grievance than there is now over its rise in numerous places since the advent of electric lighting. The increase goes on by littles; and it is only by periodical comparison that the truth is found. But these expensive units being sold for public lighting at less cost than is charged to the private consumers, someone has to make up the difference. The public lighting merely bulks-up the number of units sold and the revenue received. This gives the fictitious appearance of growth of prosperity, that has no reality in profits; so that from the economic aspect, there is a good deal of fallacy about it.

There is some mention in one of the papers of the fact that the Norwich Corporation are proposing an extensive scheme of side street lighting by metallic filament lamps. But this does not give any support to our Yarmouth friends, or alter in any way our contentions. Norwich also owns the electricity undertaking; and there perhaps, as at Yarmouth, electrical pride and municipal ownership take precedence in the considerations that affect the question. The writer in the Yarmouth "Mercury" takes exception to our statement that the proposed increased adoption of electricity for public lighting is for no other purpose than for imparting a better showing from the volumetric point of view to the accounts of the department. With chastened spirit, we read: "The ['JOURNAL'] writer is in absolute ignorance of the facts of the case so far as Yarmouth is concerned, or he would not have so libelled the Corporation. For instance, out of a total income last year of £20,385, only £2931 was received for public lighting. To suggest that this comparatively small sum could make a great difference to the accounts is sheer stupidity on the writer's part." Many thanks! We regard with positive admiration a newspaper writer who can look upon the one-seventh part of the electricity undertaking's income as a comparatively small sum. What to a man of such affluence may appear to be sheer stupidity may not appear so to others less fortunately circumstanced. We wonder whether our friend has calculated out, on behalf of the private electricity consumers, the number of units the £2931 represents in relation to the number represented by the revenue obtained from the private consumers. If he has, perhaps he will find the private electricity consumers as well as the Gas Company have cause of complaint. But with regard to the £2931 (we are not off-hand aware whether it includes receipts from public buildings), it merely indicates what the Corporation have done, and not what they are proposing to do, which is the present bone of contention.

There is one other point in the "Mercury" regarding the electricity undertaking. The writer alludes with pride to what he regards as "facts." A large sum, he naively says, is being set aside as sinking fund—in other words, a highly remunerative and

successful undertaking is being purchased by the town without the cost of a single penny to the ratepayers—and the rates have been relieved to the tune of £4200. Let us deal with this in the reverse order. The relief of the rates by a total sum of £4200 is not a matter for boast after fourteen years' trading. For information only, we should like to know whether, during this period, the ratepayers have been relieved of any sums in support of the concern, and, if so, to what extent? As to the undertaking being highly remunerative and successful, our records as to Yarmouth inform us that the deficit was £14 in 1907-8, and the surplus last financial year was £194, during which year the increased income from private consumers amounted to £4! We like the innocence that suggests that the sinking fund is purchasing a remunerative and successful undertaking. Electrical plant has a comparatively short life. We do not remember ever having noticed that the Yarmouth undertaking has been in a position to accumulate reserve and depreciation funds. If not, there must be reborrowings for replacement. Under such circumstances, when will the ratepayers conclude the purchasing of this "remunerative and successful undertaking?" We do not approve of perpetual hire-purchase systems. Certain it is that the present generation of Yarmouth ratepayers will never come into the glorious possession foretold by the "Mercury" writer. And, mark this, the extension of the public lighting, through the low-priced units coming on top of the private lighting load, will not improve the ultimate financial position of the Electricity Department, although the accounts show an increased business.

A few words more. The "Independent" writer suggests that the report on public lighting of the deputation of the City of London Corporation is valueless, because they did not take an expert with them on their travels. In all the towns visited, they had the advantage of seeing and hearing the lighting experts—gas and electricity—of the municipal authorities; and they returned home fully persuaded, from what they saw and gathered from investigation, that the inverted gas-burner is the ideal illuminant for street lighting purposes. The writer of the "Independent" has not heard of the success of the inverted gas-lamps in competition with electric metallic filament lamps at Beckenham and elsewhere; and that, from the points of view of effectiveness and cost, the public were decidedly favourable to the former, though electricity supply in Beckenham is owned by the District Council. We ask him to state his grounds for saying that "perhaps the 'JOURNAL' will wake some day to the knowledge of the circumstances that the recent development of the metallic filament lamp has done much to make electricity the ideal public street illumination, and a formidable competitor with gas as regards both effectiveness and cost." That is barren talk.

Manchester Electrical Exhibition, 1908.

A financial statement regarding this exhibition has been issued. The total receipts amounted to £19,393, of which exhibitors contributed £10,061, less a rebate since made from profits of £1989. The donations of corporations amounted to £1133; gate money and tickets realized £4750. Among sundry matters it is seen that "commission" on refreshments amounted to the nice little sum of £1033. The cost of the buildings was £4031, and incidental expenses £908. A sum of £1216 was spent on advertising. The electrical decorations cost £1116—fittings, wiring, and current. Gas was not altogether excluded from the building, as we see that £188 was expended on gas, water, and mains. The profit of £6317 was utilized in rebates, benevolence, &c.

Manchester and District Junior Gas Association.—The annual lecture to the members of the Association will be delivered in the Manchester University next Saturday afternoon, by Professor Harold B. Dixon, M.A., F.R.S.; his subject being "The Chemistry of Flame." The Council of the Association extend a hearty invitation to members of the Manchester District Institution of Gas Engineers to avail themselves of the opportunity of hearing Professor Dixon on the important subject that he has chosen. Arrangements have been made for an inspection of the gas-meter testing-station and the London Road fire-station of the Manchester Corporation.

Earth Currents and Water-Mains.—In the "Zeitschrift für Electrochemie" for Sept. 15, Herren F. Haber, F. Bergius, and P. Krassa discuss the question of the attack of water-mains by wandering currents from tramways and the like. According to an abstract translation of the article in the "Chemical Trade Journal," they conclude that alternating currents with a periodicity of from 15 to 50 may be regarded as safe—that is to say, that neighbouring water-mains will not suffer damage. The proposal to reverse the direction of the current in direct circuits, at intervals of one, two, or four hours, is shown to be valueless, as no reduction in the rate at which iron is attacked is found to attend this procedure. In particular cases in the neighbourhood of Karlsruhe, they find that the amount of damage done by earth currents exceeds by many times the normal chemical corrosion by the ground water. The skin of cast-iron pipes, while intact, affords considerable protection against both chemical and electrolytic attack, but is liable to break down locally when powerful local corrosion follows.

OBITUARY.

RICHARD LAYBOURNE.

WHEN referring, in the "JOURNAL" for the 12th ult., to the distribution of awards in connection with the garden allotments of the Newport (Mon.) Gas Company, it was mentioned that the venerable Chairman, Mr. R. Laybourne, was unable to be present on account of illness. We regret to record that this terminated fatally on the 25th ult. Until a few months ago, he had taken an active part in the concerns with which he was connected; and he presided at the half-yearly meeting of the Company in August last. But he began to feel the infirmities of advanced age (he was in his 85th year); and he gradually grew weaker until his death. Mr. Laybourne was the second son of the late Mr. Jacob Laybourne, of Nafferton Lodge, East Yorkshire. He selected the career of an engineer, and served his apprenticeship at the Hareshaw Iron-Works, Northumberland. In 1847, he was engaged at Messrs. E. B. Wilson and Co.'s Railway Foundry, Leeds; working first in the shops and subsequently as chief draughtsman. In the latter capacity he visited Hanover to inspect the railways; and he designed engines for the Hanoverian Government. In 1852, he was appointed Assistant Locomotive Engineer to the London and North-Western Railway at Wolverton; and two years later he settled in Monmouthshire as Locomotive and Carriage and Waggon Superintendent for the Monmouthshire Railway Company. Having served the Company for fourteen years, he was appointed General Manager of the Rhymney Iron Company, and designed and erected Bessemer steel-works and plant capable of producing 1000 tons per week. In 1878, he took an active part in the management of the Isca Foundry and Engineering Company at Newport; the management of these works being now in the hands of his sons. In addition to the Newport Gas Company, he was Chairman of the Tirpentwys Colliery Company, and the Weston-super-Mare (Old) Pier Company. He was a Justice of the Peace and Deputy Lieutenant of Monmouthshire, and was High Sheriff in 1894. He was a Director of the Newport and Monmouthshire Hospital, and Past Master of the Isca Lodge of Freemasons. He was a member of the Institution of Civil Engineers, having been admitted in 1868, and a Past-President of the South Wales Institute of Engineers. He leaves two sons and two daughters.

The "Journal für Gasbeleuchtung" reports that Herr WILHELM KLEINFELDT, the Manager of the Reutlingen Gas and Water Works, in Würtemburg, died on the 20th ult. at the early age of 43. Deceased had drawn up plans for a new gas-works for the town of Reutlingen, which had been approved, and the construction of the works is already in hand.

The recent death is announced of Mr. JOHN W. BROOKE, of Mistley, the Secretary and Manager of the Manningtree Gas Company, Limited. Deceased had been unwell for some time, and had undergone an operation. Another was, however, called for; and, unfortunately, to this he succumbed. He was highly esteemed; and at his interment in Mistley Churchyard every mark of respect was shown.

STANDARD RATES OF WAGES.

SOME idea of the wide variation in the remuneration given in different parts of the country for the same class of work, may be gathered from a statistical report of the Labour Department of the Board of Trade which sets forth the standard rates of wages and hours of labour that were in vogue in connection with a number of trades on Oct. 1 last.

The place of honour in the report is occupied by the building trades, the information in regard to which has been supplied by the Employers' Associations and the Trades Unions concerned, so that the figures may be accepted as reliable. The next portion of the report has reference to the engineering and shipbuilding trades, which comprises the following seven sections: Engineers, sea-going engineers, brass moulders and finishers, ironfounders and pattern makers, boiler-makers and iron and steel ship-builders; shipwrights, shipjoiners, ship plumbers, and ship painters; and electrical workers. The statistics given in the first section—engineers—are compiled from information furnished by the Amalgamated Society of Engineers, so that there should be no reason to question their accuracy. In the London district, the rate of pay per week for turners, fitters, and brass finishers is given as 40s.; and that for smiths, as from 40s. to 49s. Millwrights earn 42s. 6d., pattern makers 44s. 6d., and copper smiths 40s. The weekly hours of labour are stated as 54 and 48. In the marine shops at Cardiff, Newport, and Swansea, there is a uniform rate of 41s. per week of 53 hours, though there are a good many other cases in which the wages are stated as being round about 28s. per week of 54 hours. At Cardiff, a marine electrical engineer earns the uniform rate already referred to, 41s.; while general electrical engineers obtain 40s. in London, Erith, and Montrose, and at Keighley no more than 29s. a week.

The "other trades" included in the report embrace the following: Letterpress printers—compositors; lithographic printers, bookbinders, and machine-rulers; cabinetmakers, &c., French polishers, and upholsterers; gas stokers; bakers; boot and shoe

operatives; farriers; police constables; seamen; and agricultural labourers. In this section, the only item that we need trouble about is the standard rates of wages and hours of labour per shift recognized on Oct. 1 last for stokers in gas-works in the principal towns of Great Britain—based on information furnished by the employers and the National Union of Gas Workers and General Labourers. The figures given relate to 51 towns, in addition to the London district; and they include five places in Scotland, but none in Ireland. In all but five of the towns, the eight-hour shift is worked; the whole of the London district being with the majority in this respect. The exceptions are Wakefield, York, Tunbridge Wells, and Exeter, where there are twelve-hour shifts; and Lancaster, where nine-hour ones are in vogue. The general rate of payment for weekday work is between 5s. and 5s. 6d. per shift, though several towns fall below the smaller of these amounts. In Sheffield, 5s. 9d. is paid; and so it is in Birmingham, to stokers employed in working drawing and charging machines. For North Shields, too, the rates are given as 5s. 5d. and 5s. 8½d., *plus* 5 per cent. The London district figures are as follows: East, 6s.; south-east, 6s.; south-west, 5s. 9d.; Beckton, 5s. 9d.; West Ham, 6s.; Southall, 5s. 10d.; and Brentford, 5s. 10d. It is stated that double time for Sunday work is paid in all parts of the London district but the south-east, where time-and-a-half is the rule, as it also is in most of the other towns. In a dozen cases, four of which are in Scotland, the rate of payment is the same for Sunday as for weekday work.

ITALIAN GAS WORKERS' MEMORIAL.

In the "Journal" for the 19th ult. (p. 175), we referred to the present relations between the gas workers of the Union des Gaz Company in Italy and the Directors of the French Company with the interests of which the English Continental Union Gas Company, Limited, are so closely concerned. From the Italian newspapers, it is learned that the fresh demands of the men in the Company's Italian Gas-Works have been formulated, and presented to the Company in the form of a general memorial. On the 19th ult., this memorial was left in the hands of the Company's Manager for Italy (Signor Grüss); the men's deputation consisting of three representatives of Milan, two of Alessandri, two of Modena, and two of Genoa.

The memorial occupies four pages of typewritten matter, and deals with a variety of questions to the number of sixteen. Among them are the following: The abolition of piece-work and sub-contractors; the publication of a new edition of the *Organico* (or agreement between the Company and the men), embodying all modifications down to date; the compilation of regulations dealing with dismissals; the question of pensions; a demand for 24 non-working days in the year for those who do not benefit by the weekly day's rest under the recent law; pay according to the higher category for those who temporarily fill higher positions; the qualification for old-age pensions to be reduced from 60 to 50 years of age for furnace or acid workers; a seniority gratuity of lire 5 per month after 21 years' service; a reduction of hours of work from ten hours to nine for all classes from November to February; and a general increase of 10 per cent. in wages.

A definite reply to these various demands was promised by the end of the month; and the men's representatives desired to discuss them—not with Signor Grüss, but directly with representatives of the London and Paris offices of the Company. They wish to show that with reasonable reforms, and with closer regard to contracts, the enormous capital of the Company could be made more profitable, and gas improved to the great advantage of the consumers. The ex-Secretary of the Federation of Gas-Workers (Signor Speroni), in an interview with "Il Secolo," says: "We will show the possibility of making economies to the great advantage of the Union des Gaz and its customers."

With reference to the recent shortage of gas due to a few hours' cessation of work, the following figures as to storage accommodation are given:

Works.	Cubic Metres.
Nine gasholders at San Celso	85,300
Three ,, Porta Nuova	6,000
Three ,, Porta Venezia . . .	27,000
One gasholder at Porta Magenta stationa .	25,000
Storage at Bovisa	80,000
Total	223,300

[or, say, a total gasholder capacity of 7,886,000 cubic feet.]

"If," says Signor Speroni, "the average daily consumption, which in November, 1908, was 230,000 cubic metres, distributed to about 119,000 consumers, may be estimated to be increased this year by 8000 consumers, there will be required 250,000 cubic metres" [say, 8,829,000 cubic feet].

The Milan newspaper "Corriere della Sera" also devotes space to an interview with Professor Antonio Laderchi, the Secretary of the Federation of workers attached to the Italian works of the Union des Gaz Company. He appears to justify the present agitation on the ground that the previous agreement in 1907 left many matters outstanding, which are now due for settlement. As to the proposal of co-partnership, he says: "But co-partnership in what? Not indeed in profits, because in that case—given the return due to capital, the recompense due to labour, the part due to amortizement—the residue ought to be divided between capital and labour on the basis of profit and reserve. Now, it is not said what return is reserved for capital, nor is any investigation of the balance-sheet afforded, nor are bye-products included. . . . In fact, the Company does not say, 'Share in my profits;' but it says 'Save, and I will share in your savings.'" The Italian paper, perhaps wisely, does not enter upon the merits of the questions involved. It adopts a non-committal attitude, but supports the view that the direct intervention of the Directors of the Union des Gaz might be beneficial in the interests of all parties, and not least those of the citizens in the towns concerned.

THE "FIAT LUX" LIGHT CONTROLLER.

An addition to the various appliances now on the market for lighting and extinguishing gas-lamps from a distance is coming prominently forward under the name of "Fiat Lux." It is not altogether unknown to London gas men, as it was brought under their notice at the *conversazione* of the London and Southern District Junior Gas Association in the spring of 1907, and was briefly noticed in our columns at the time. It did not, however, then bear the name which has since been given to it. The inventors of the appliance, which is of the diaphragm type, were reluctant to push it until the initial difficulties had been successfully overcome, and it had emerged from the experimental stage. But as soon as it had done this, steps were taken to have it brought into use on a working scale in connection with public lighting; and we learn that so rapid has been its adoption, that whole districts and towns in some of the principal countries on the Continent have it in operation, to the entire satisfaction of managers of gas-works, technical engineers, and others. This statement is borne out by testimonials contained in a small pamphlet from which several of the foregoing particulars have been obtained.

The advantages claimed for "Fiat Lux" are many; one of the most important being the great saving it effects by enabling the lighting and extinguishing of the street-lamps to be controlled from the gas-works or any other centre that may be desired, and by conserving the life of the incandescent mantle. It is claimed for the appliance that it can light or extinguish some 50,000 lamps instantaneously—an important feature in the event of sudden darkness or fog. The "Fiat Lux" can be fitted to existing street-lamps; there are no springs, mercury, or delicate parts to get out of order; and no special plant is required for its use, as it is operated merely by pressure from the gas-works. The appliance has been patented; and the owners of the patent have entrusted Messrs. Willis, Stewart, and Co., of New Broad Street, with its introduction into England, and have appointed them their sole representatives for Great Britain and Ireland.

The Committee appointed by the Royal Scottish Society of Arts to award prizes for communications read or reported on during session 1908-09, have awarded Keith prizes of the value of £5 to Mr. W. Shearer, for his paper on "An Improved Apparatus for Producing Petrol Gas for Lighting and Heating Purposes," and to Mr. W. Key, for a paper on "Notes on the Centenary Air-Gas Turbine Generator."

In the remarks of Mr. A. Smith, of Tradeston, on the President's Address at the meeting of the Scottish Junior Gas Association (Western District) on Oct. 23, as given in the "Journal" last week, he is reported as saying that the coal-testing plant at Tradeston was capable of dealing with "a thousandth part of a ton." He writes to say that his statement was that "the plant at all the Glasgow gas-works was the same—capable of dealing with a hundredth part of a ton—viz., 22·4 lbs."

We have received from M. Enrique Hauser, Professor at the Madrid School of Mines, a pamphlet containing his first address to that school on fire-damp and the apparatus he has devised for its detection. This formed the subject of a paper submitted to the International Congress of Applied Chemistry that opened in London in May last; and it has been reproduced in the "Bulletin et Comptes Rendus Mensuels de la Société de l'Industrie Minérale," St. Etienne, France, for September.

Mr. Alexander Mitchell, the Secretary, and until quite recently the Engineer and Manager, of the Bury St. Edmund's Gas Company, has accepted an invitation to fill the office of Mayor for the ensuing year. Mr. Mitchell took up his abode in the town nearly thirty years ago; but he did not become a member of the Corporation till about eight years since. He has rendered good service on some of the most important Committees, including that having charge of the electric lighting, and also the Finance and Education Committees.

The resignation is announced of Mr. James Parkinson, the Town Clerk of Brighouse. Mr. Parkinson has been associated with public life in the district for over thirty years. He was appointed in 1878 Gas Manager at Brighouse and also Clerk to the Local Board. He remained in these positions until 1893, when he was made Town Clerk and Gas Engineer. Recently he was relieved from the position of Gas Engineer; and since then, as our readers will be aware, there has been an investigation (*ante*, p. 197) into affairs connected with the Gas Department.

GAS PRACTICE IN AUSTRALIA.

RECONSTRUCTION AT THE MELBOURNE GAS-WORKS.

By P. C. Holmes Hunt.

It may be fairly assumed that there does not exist a gas undertaking which has experienced such a great fluctuation in its business as has the Metropolitan Gas Company of Melbourne. Following the incorporation of the Company in 1878 by the amalgamation of the three old Companies, the output of gas in Melbourne had a steady increase for a few years, and then a rapid increase (at the rate of over 11 per cent. compound) up to the year 1890. During that year things in Melbourne reached their height; and the bursting of the "boom" in Victoria in the following year, accompanied by the failure of the banks, is doubtless recollected by many of your readers. Following that, depression set in, and the gas consumption fell rapidly and regularly—reaching the low-water mark in 1897, in which year the gas manufactured was only 1,167,900,000 cubic feet as compared with 2,136,631,000 cubic feet in 1891—a reduction of rather more than 45 per cent. What this means to a gas undertaking, will be readily realized by gas engineers, for capital had to be spent in providing plant to produce the output in 1891—a very large proportion of which was lying idle for many succeeding years.

In 1900, the turn of the tide came, and slight increases were again experienced until some four years ago, when owing to largely increased prosperity in Victoria, the introduction of slot meters, and other factors, a much bigger increase in consumption was experienced; and in 1908 the gas made was 1,760,791,000 cubic feet. The output is still, therefore, considerably below what it was 17 years ago, though, according to the present increase, a few years should see that of 1891 equalled. But, as already stated, a considerable increase in consumption has been experienced during the past few years, necessitating heavy expenditure on the reconstruction of old and obsolete plant in order to produce gas more economically by up-to-date methods. Consequently, when the writer assumed charge in the middle of 1906, he found himself face to face with having to reconstruct the benches in two retort-houses—one at the West Melbourne, and the other at the South Melbourne works. At the former, the main arches were in an advanced state; and the special work involved was the decision as to the type of machinery to be adopted. After a great deal of consideration, the De Brouwer projector and the Jenkins-De Brouwer pusher, which was then in considerable favour at Home, were selected; and a De Brouwer hot-coke conveyor was also installed. A description of this plant appeared some time ago in the "Journal."

Photo. No. 1.—Panoramic View showing a Portion of the Retort-House with Roof raised, the Coke Conveyor, and the New Sulphate House.

Reconstruction at the South Melbourne Works.

At the same time as the West Melbourne work was proceeding, the design for the reconstruction of the South Melbourne retort-house was taken in hand. As the latter was on somewhat similar lines to the installation recently put in at Derby by Mr. J. Ferguson Bell—whose most interesting paper at the recent meeting of the Institution of Gas Engineers has lately reached us—probably some description of the plant erected in Melbourne in 1907-8 may be of interest to engineers in the Old Country.

The retort-house at South Melbourne is 460 feet long by 120 feet broad, originally built with retort-benches down the centre and coal-stores on either side. In the northern half were two sections, each comprising ten direct-fired settings containing oval retorts, hand charged; and in the southern portion, twenty beds of seven direct-fired Ω retorts. The latter are operated by means of Arrol-Foulis machinery. Attention was directed to the reconstruction of the northern half of the house.

Position of Coal-Stores and Retort-Setting Adopted.

It was determined first to place the new bench out of the centre of the house, in order to avoid having coal-stores on both sides (the concentration of coaling operations offering a much improved arrangement), and to facilitate the removal of coke into the yard—arguments brought forth, of course, as the result of the introduction of the new type of projector-chargers and the successful initiation of pushing the coke instead of pulling it out of the retorts. Moreover, the single store could be arranged to accommodate more coal than the two separate ones—an important point where it is necessary to carry such large stocks of coal as in Melbourne. Conveniently situated in the coal-store are two coal-elevators, with crushers; the latter, together with all driving gear, being housed in roomy cellars placed centrally under the store and approached by subways entered outside the retort-house. Close consideration was given to the type of setting to be adopted; settings of eights, in which the retorts are set in four tiers, being decided upon. There were several reasons which led the writer to adopt this. First, the setting offers a large combustion chamber, and the retorts can be more evenly and easily heated. This appealed strongly to the author, because it suggested a very convenient way of arranging the retort-house work.

In speaking in the discussion on carbonization at the meeting of the Victorian Gas Managers Association held in Ballarat in November last, the writer said: "To that end (eight-hour charges) the new plant just put in at South Melbourne was deliberately designed; and so far as they had gone, they were quite satisfied with the results obtained from it." This remark expresses the fundamental idea underlying the general design. He was desirous of adopting an arrangement which he conceived would facilitate such a system of work, and which appeared to offer more advantages than the ordinary setting of eight. Moreover, it was found that twenty such beds with chimneys could be erected on the area to be dealt with. The installation therefore comprises this number set in one bench, with an extra wide pier between the tenth and eleventh settings. The retorts are Ω-shape, 21 in. by 15½ in. by 20 ft. long; this section being necessarily used as the retorts were already on hand, otherwise the writer would have preferred a larger section.

Ascension Pipes, Mouthpieces, and Tar Arrangements.

The writer had no difficulty in deciding to adopt only one ascension pipe. Such a course effected a saving in capital outlay of over £1000. Moreover, one cannot see why a horizontal retort should not work satisfactorily with a single ascension pipe when an inclined retort does, despite the fact that in the latter case the pipe is fixed at its lower end. Single ascension pipes were therefore determined upon; and these (7 inches in diameter) were placed on the charging side of the bench as being the more convenient. On the discharging side, only short mouthpieces are provided; and thus it is arranged that the ascension pipes are attended to on the same side as the machines are manipulated and the coal handled. On the opposite side of the bench, the only work required is the opening and closing of the lids, the feeding of the producers, and, of course, the clinkering of the furnaces; a conveyor being installed in order to carry away the coke.

The ascension pipes lead into the hydraulic mains in the ordinary manner; but the latter are of special trough-shaped section to facilitate the removal of tar. For convenience in running off the liquor and tar, the hydraulic mains are arranged in four sections; the mains from five beds working into their own tar-tower. There are thus four tar-towers provided; one being fixed at the ends of the bench, and the two centre ones in front of the wide pier referred to above. The general arrangement will be better understood perhaps from photograph No. 2. A 24-inch foul main collects the gas from the hydraulic mains; and two of "Cowan's" retort-house governors are installed for regulating the exhaust. The arrangement of pipes and mains has proved quite satisfactory; for although the plant has been at work now

for over twelve months, only three stopped pipes have been experienced. We may, in fact, truly say that stopped pipes in this retort-house are practically unknown.

Machinery Selected.

The stoking machinery selected was again the De Brouwer projector and the Jenkins-De Brouwer pusher. The charging-machine carries in its own hopper 5 tons of coal; this being filled from two centrally situated overhead hoppers as required. The hot-coke conveyor is also of the De Brouwer type, the longitudinal conveyor running in front of the retort-benches and emptying into a cross conveyor in which the coke is quenched before being deposited in the yard. Photograph No. 3 shows the general arrangement on the discharging side.

Other Features.

In addition to the single ascension pipes—and probably this is one of if not the largest installation of horizontal retorts so fitted—the bench contains one or two other features of special interest. It has been pointed out that the general reconstruction allowed for the provision of a coal-store on one side of the bench. As will be gathered from the photographs, the retort-house and coal-stores are covered by the same roof; lattice girders supporting it, and spanning the house. In moving the bench off the centre of the house, it was, of course, necessary to erect a division wall, in order to separate the coal-store from the retort-house proper. After some consideration, it was finally decided to build this of reinforced concrete and also the stage floor carrying the stoking machines; this type of structure coming out somewhat cheaper than a brick wall and steel floor. Photograph No. 5 shows the method of construction of the wall, embodying a system of counterforts joining into a base-plate running the whole length of the store. The charging stage was not carried close up to the buckstays, so as to guard against any effects of expansion; the space between the edge of the concrete floor and the bench being filled in with steel plates. The floor is finished with a granolithic surface; and it has proved to be most satisfactory in working, easily kept clean, and an easy operating floor for those continuously engaged upon it.

On the discharge side something in the form of a novelty has been introduced, but which has proved a very satisfactory innovation. It consists of a machine embodying the combination of a travelling platform and coke-shoot, and is propelled by an electric motor supplied with current from overhead wires in the usual way. The coke-shoot is specially designed to catch the coke from the top tier of retorts and deflect it into the furnaces—an operation easily carried out and conveniently directed by a man standing on the platform at its rear. The shoot is fitted with a movable bottom plate; so that when the coke is not required for the furnace the plate is withdrawn, and allows the coke to run into the conveyor—thus preventing it falling on, and spreading over, the stage floor. The platform serves the double purpose of allowing convenient inspection of the top tier of

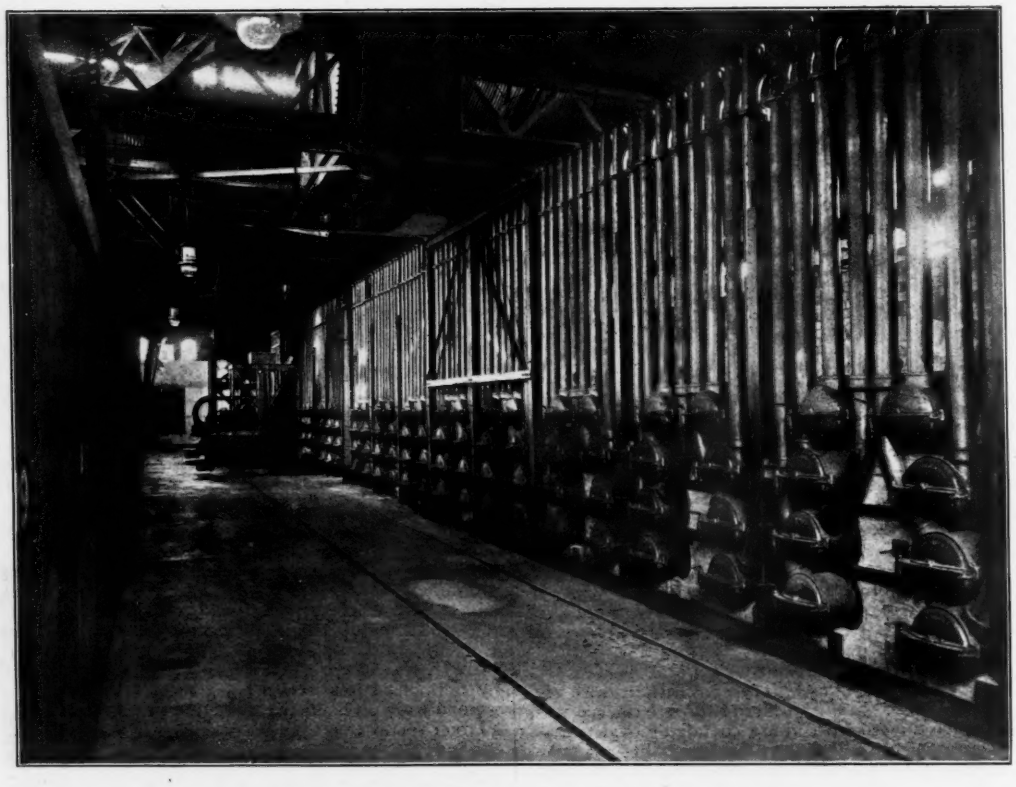


Photo. No. 2.—Interior of the Retort-House—View of the Charging Side.

retorts, and also makes it handy for the men to close the lids of the top retorts after discharging; while the work of directing the coke into the producers is made much easier. The machine works most satisfactorily, and not only simplifies and assists the work of the men, but has also proved a genuine labour saver. Photographs Nos. 6, 7, and 8 fully illustrate the apparatus, and show it in action.

Power and Power-House.

It was determined to use electricity for all purposes, and to concentrate the power in the exhauster-house some distance away from the retort-house; the arrangement being one to which electricity readily lends itself. Electricity was, of course, necessary for the De Brouwer machines and the travelling platform; but, in addition, a motor was provided for driving the coke-conveyors and conveniently placed on the stage floor (as shown in Photograph No. 3), and motors were also provided for driving the coal crushers and elevators.

The electric generating plant is all in duplicate; each set comprising a 100 B.H.P. Crossley gas-engine coupled direct to a British Westinghouse dynamo of the direct-current type, capable of developing 65 kw. at 220 volts. To accommodate this plant, a new power-house, 69 feet long by 55 feet wide, was provided. This was erected over the old exhauster-house; the latter being cleared away when the former house was on the point of completion—the finished house containing room for a third generating plant when necessary, and also for an additional set of exhausters. As will be seen from Photograph No. 9, the switchboard is fixed opposite the dynamos; and the arrangement is such that, on one side of the power-house, the whole of the electrical work is placed, and on the opposite side the exhausters, gauges, and everything connected with the gas manufacture proper. Fixed over the switchboard is a specially-designed indicator under control only of the retort-house foreman, who rings the order "switch in" when power is required for each draw, and likewise signals "done with" when the draw is finished.

The electricity is conveyed by two main cables to a distributing board fixed at the end of the stage floor in the retort-house, and in which are placed switches to the various machines; the whole being under the control of the shift foreman. The general arrangement has proved all that could be wished; and the adoption of electricity for all power requirements has thus fully justified itself. Whatever the opponents of the adoption of electricity in gas-works may say in defence of their attitude, they cannot get away from the fact that it is peculiarly adapted for gas-works purposes, and is especially convenient and not expensive. With the exception of minor difficulties inseparable at the starting of new plant, we have had no trouble at all with the installation since it was started; and the secret of continuing so appears to be the maintenance of constant and careful supervision.

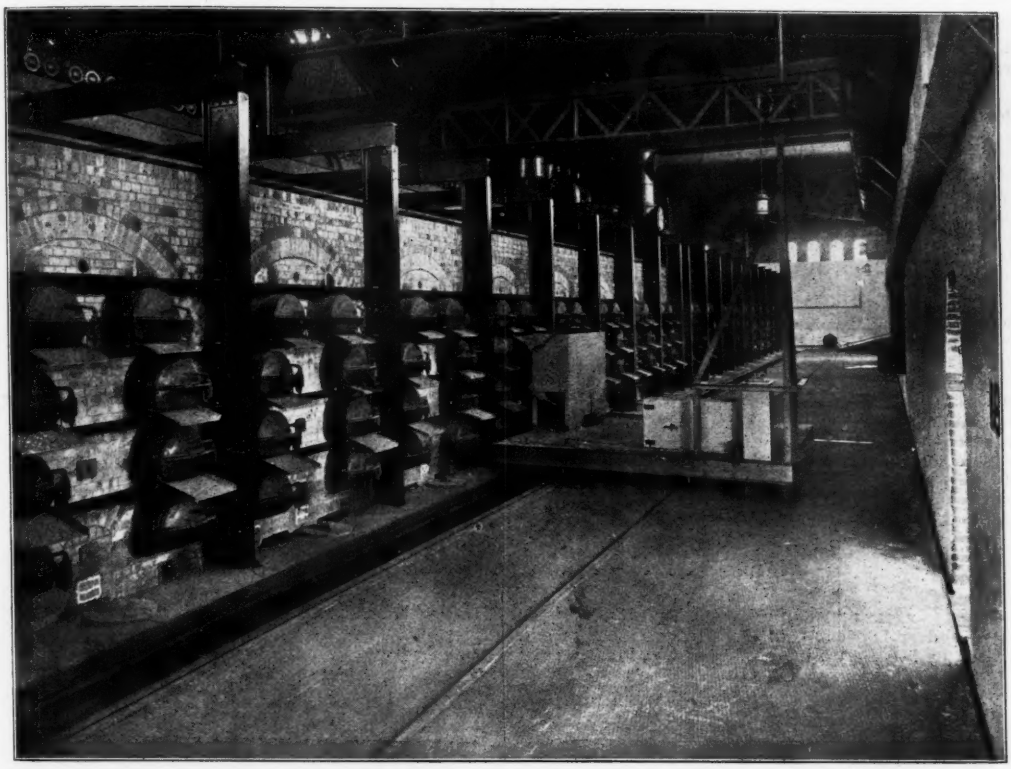


Photo. No. 3.—General View of the Discharging Side, showing the Combined Travelling Platform and Coke Shoot.

Erection.

It may be mentioned here that the whole of the brick and constructional work, including the general fitting up and erection of the machines and coke-conveyors, was carried out by our own staff and workmen; the buckstays, cross girders, and stage-floors being erected by local firms. Having settled on the design, mouthpieces, ascension pipes, and other essentials were ordered from Home early in 1907, and the actual work of reconstruction commenced in July of that year; the desire being to get completed in time to assist in manufacturing the winter output in 1908. The roof of the house was raised 7 feet—a tedious job, as it all had to be taken down and re-erected. But despite disabilities it was successfully accomplished. The foundation for the bench consisted of a concrete raft 12 inches thick, reinforced with expanded metal, on top of which were built brick piers as footings to the piers of the main arches and the main flue walls. The intervening spaces were filled with earth and waste material, and then on top of the whole a secondary raft of concrete, 6 inches thick, also reinforced with expanded metal, was laid. On this raft the settings were erected; locally made "Darley" fire-bricks being used throughout, with the exception of the facings of the main piers and the front walls of the retort-settings. English retorts were put in nineteen of the settings; the twentieth containing sectional retorts specially made for us by the Darley Fire-Brick Company. The regenerators are of quite plain tile design, bonded in a particular way to prevent short-circuiting.

Photo. No. 4.—View on the Ground Floor of the Retort-House, showing the Furnace Fronts.

Photo. No. 5.—The Girder Work in the Coal-Store to Carry the Overhead Railway, and Reinforced Concrete Division Wall. (Photograph taken May 5, 1908.)

The mouthpieces were supplied by Messrs. Tangyes Limited; the ascension and arch pipes, also the stoking machines and coke-conveyors, by Messrs. W. J. Jenkins and Co., Limited; the hydraulic mains by the Austral Otis Engineering Company (a local firm); the buckstaves, cross girders, retort bracing, and

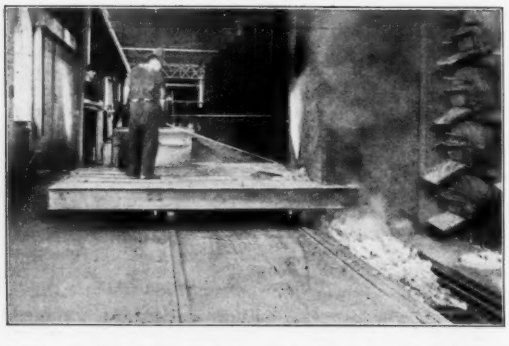


Photo. No. 6.—Showing the Travelling Platform and Coke Shoot, with Moveable Bottom Plate Withdrawn, and Coke being Directed into the Coke Conveyor.

stage-floor on the discharging side by Messrs. Johns and Waygood, Limited (also a local firm); while the stage floor on the charging side, and also the coal-store division wall, were carried out by, and to the detail designs of, the Reinforced Concrete and Monier Pipe Construction Company, of Melbourne. Messrs. Noyes Bros. (Melbourne) Pty., Limited, carried out the contract for the electric generating plant and motors.

As an instance of how an engineer's calculations at this end of

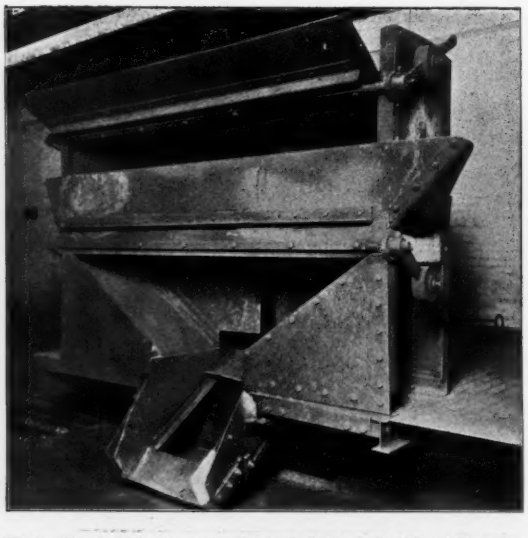


Photo. No. 8.—Showing the Design of the Coke Shoot Opposite the Retort Mouthpieces—the Moveable Bottom Plate Withdrawn.

the world may be upset, it may be recorded that completion of the plant was delayed by the ship carrying the major portion of the coke-conveyor running ashore off the West Coast of Africa, necessitating the shipment having to be duplicated, and so delaying its arrival here for five months. In consequence, we had,

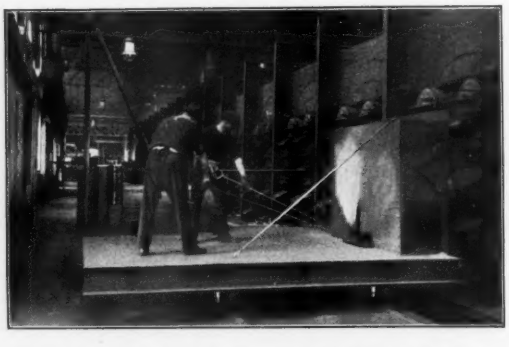


Photo. No. 7.—Showing the Travelling Platform and Coke Shoot, with the Moveable Bottom Plate in Position and the Method of Filling Coke into the Furnaces.

unfortunately, to start the installation to work without the conveyors. Some of the beds were first put into action on July 14, 1908; the new plant taking up the whole of the make at these works four months later, when the conveyor was in position.

Capital Cost.

The total cost of the work, including the demolition of the old benches, was £45,099. Including only the bench itself, stage floors, stoking machinery, crushers, elevators, and power plant, the installation cost £37,632; equivalent to a sum of £117 12s. per mouthpiece.

Method of Working and Working Results.

From the commencement, we have worked the retorts with eight-hour charges—a course justified by the successful working in this way at West Melbourne—and although they were kept rather under 8 cwt. for some time after putting the plant into action, the charges have averaged for the greater portion of the time about 8¼ cwt. With this system of working the results have certainly been most satisfactory; while the carbonizing operations are conducted without any hitch or minor troubles.

It is not possible to quote results over a long period, since for most of the time other carbonizing plant at the works has also been in action, and the gas is not purified and measured separately. It may be said, however, that we produce at any rate 11,000 cubic feet per ton of 15-candle power gas tested with the old type 15-hole argand at the 5-feet rate, the calorific power being about 580 B.Th.U. net; while the coke made for sale will average nearly 11 cwt. per ton of coal carbonized. These figures, however, do not probably convey very much, since the majority of your readers are necessarily unfamiliar with Australian coals. Speaking generally, however, the eight-hour charges have given us most satisfactory results, "six-hour work," in the words of the American, being "a back number." It remains, however, to be proved whether twelve-hour charges would give still better results, and whether also they would offer relief in regard to the carbon nuisance, which has developed under the existing system—the retorts having to be scurfed every ten weeks.

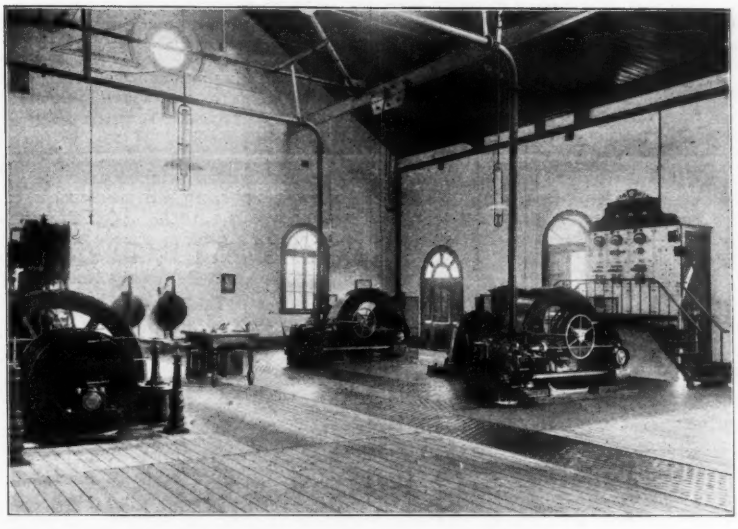


Photo. No. 9.—Interior of the Power House.

Wages are so much higher in Australia than in England that it would not be advantageous to quote manufacturing costs. It may, however, be stated that, with twenty beds at work, eight men per shift are employed—two machine men and one backer-up on the charging side, two platform men on the discharging stage, and two firemen and one coke-conveyor attendant. Additional men are engaged at the coal-crushers, the number varying according to circumstances. Ordinary draws (twenty retorts) take about twenty minutes, and firing draws twenty-five minutes.

Other Extensions.

Mention may be made that considerable other alterations have been recently undertaken at these works, apart from retort-house reconstruction. With the object of improving the general arrangement of the plant, and in order to place the ammonia extraction plant under better control, connections to the washers and scrubbers were altered so as to place all the various apparatus—with the exception of the condensers—on the pressure side of the exhausters; the washers being hitherto on the suction side. This involved the laying of two 24-inch mains, and a great deal of work in cutting and altering various connections; necessitating numerous stoppages of manufacture in order to carry out the alterations, and an expenditure of some £1500. Work of this character, necessitating as it did cutting over thirty live mains (chiefly 24-inch), requires special precautions against risk of accident; and every care had to be exercised in carrying out the alterations. In order to reduce the possibility of sparking, all tools were kept wet while cutting, and bronze hammers used for striking, and as soon as a main was burst open, wooden discs were placed in the open spigots and clayed-up temporarily. The work, carried out during the summer of 1907-8, has well repaid itself; the yield of sulphate of ammonia having increased considerably since the alterations were made.

Photograph No. 1 is a panoramic view of a portion of the works, and shows the raised portion of the retort-house, the coke-conveyor emptying into the yard, and the new sulphate-house just on the point of completion. It will be noticed that this building is divided into three portions; the boiler-house being on the left, the plant-house in the centre, and the store on the right. The plant-house is especially high to accommodate one of Messrs. C. & W. Walker's complete plants, with overhead saturator, having bottom discharge, and capable of manufacturing 4 tons of sulphate per twenty-four hours.

Such is a brief description of the reconstruction at one of our Melbourne works. More retort-house reconstruction and extensions loom ahead. And the question is, Shall it be horizontals designed for heavier charges, vertical retorts, or carbonizing chambers? The point is an all-important one at present for any works. Possibly we in Australia find it a bigger question to solve satisfactorily than our *confrères* at Home.

THE "BURKHEISER" PROCESS OF PURIFYING GASES OF DRY DISTILLATION,

WITH SIMULTANEOUS PRODUCTION OF SULPHATE OF AMMONIA, WITHOUT THE ADDITION OF ACID.

[Communicated.]

Reduction of cost of production is the prime essential of industrial progress. Increasing wages, rates and taxes, and cost of raw material combine in forcing this necessity upon the producer. The most obvious, and at the same time the most important, means for reducing cost of production are: (1) Simplification of plant and processes; and (2) increased efficiency in utilization of raw materials. Means for both these purposes are afforded to producers of gas and coke by the Burkheiser process.

In regard to simplification of plant and process, it will be seen that the astonishingly simple Burkheiser process combines the operations of cleansing coal gas and producing sulphate of ammonia, and enables the same to be carried out in a minimum of space. This combination alone represents an important step in the direction of simplification and reduction of cost. Heretofore, the purification of the gas and the production of sulphate of ammonia have been regarded as separate processes. All the purifying operations were carried out with the sole object of producing gas free from impurities. The production of sulphate of ammonia was a totally separate process, requiring expensive plant. In the Burkheiser process, the sulphate of ammonia is an immediate product of the purification, obtained without inconvenience or extra cost; this result being secured by the most complete utilization of the raw material—coal.

The presence of sulphur in coal is a well-known fact; but this constituent has hitherto only been regarded as a deleterious impurity, for the removal of which large and expensive plant has been provided. By means of this plant, the sulphur was removed, but at the same time rendered useless for industrial purposes; and in this way a most valuable bye-product was wasted. It was left to the author of the Burkheiser process to recognize the value of the sulphur, and to take advantage thereof by utilizing it for binding the ammonia in the gas and producing sulphate of ammonia. The inventor recognized the fact that the proportion of sulphur in any kind of coal used for the manufacture of gas is sufficient for binding the whole of the ammonia present; and from recognition of this fact, he has developed a system of the most beautiful simplicity. The process banishes sulphuric acid from gas and coke works, and substitutes therefor the sulphur contained in the coal. This represents a saving of hundreds of thousands of pounds. In the district of Dortmund alone, more than 5 million marks were expended for sulphuric acid in the year 1907 (reckoning the acid at 32 marks per ton), for producing 155,791 tons of sulphate of ammonia. The output of England in the same year (300,000 tons) involved an expenditure of about £500,000 for sulphuric acid. A gas-works of average capacity (about 350 million cubic feet per annum) can, by adopting the Burkheiser process, save about £500 per annum on sulphuric acid alone, in the manufacture of sulphate of ammonia.

To revert to the question of simplification of plant, the amount of space occupied by the apparatus for separating the sulphur is reduced to one-sixtieth of that formerly required—partly by reason of increased absorption capacity of the purifying mass, and partly by the fact that the velocity of the gas can be increased to twenty or thirty times the former velocity. The immense value of this saving will best be recognized by gas-works managers whose work lies within large towns, where they are hampered on all sides by lack of space, while compelled to cope with an ever-increasing output. This saving alone is, therefore, an immense advantage. At the same time, the cost of the Burkheiser purifier is perfectly negligible; the apparatus consisting merely of a cast-iron vessel of a few cubic metres capacity. The system is carried out without the use of any free acid whatever, so that expensive lead linings are dispensed with, and the entire plant is exceedingly

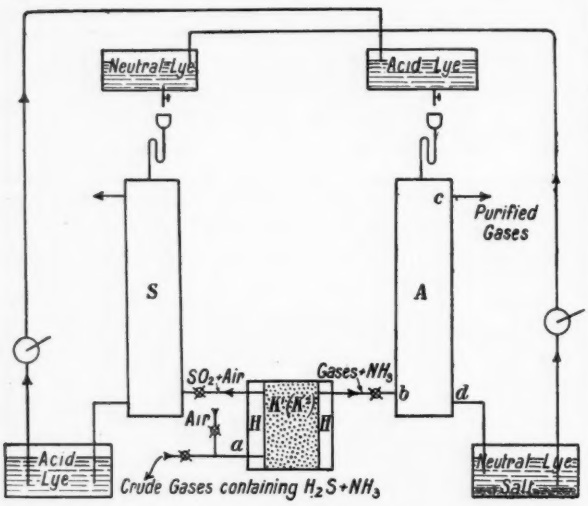
cheap. The Burkheiser process can be installed at any gas or coke works without interruption of working, and without structural alteration of buildings, &c.; and the cost of the installation is covered by the saving effected in one year. The amount of space liberated in existing buildings and rooms affords scope for any conceivable increase of output.

In the case of coke-works in particular, the Burkheiser process affords not only the advantages of simplification and cheapening of the sulphate of ammonia apparatus, and saving of the cost of sulphuric acid, but also the advantage that gas free from sulphuretted hydrogen is directly obtained. This is a factor of daily increasing importance, in view of the tendency of coke-works to undertake the supply of illuminating and power gas, free from sulphuretted hydrogen.

A Short Description of the Process.

[See also "Register of Patents," p. 326.]

In the Burkheiser process, the sulphur contained in the gas itself is converted into sulphurous and sulphuric acid and used for binding the ammonia.



The apparatus substantially consists of two uniform, but separate, chambers K^1 and K^2, surrounded by a heating jacket H, and of two washers A and S. The chambers K^1 and K^2 contain a specially prepared mass of bog-iron ore, which has an exceedingly high capacity for absorbing sulphuretted hydrogen. With the gas travelling at 150 to 200 millimetres per second, this mass is capable of separating more than 20,000 times its volume of sulphuretted hydrogen without being regenerated (as compared with former capacities of 10,000 volumes with only some ten or fifteen regenerations).

Coal gas free from tar, but retaining its ammonia and sulphuretted hydrogen, passes at *a* into the chamber K^1, containing the mass; and the sulphuretted hydrogen is separated in the chamber. The gas, still retaining the ammonia, then passes at *b* into the washer A, in which the ammonia is separated. The gas free from all impurities passes out at *c*.

When a certain quantity of gas (according to the absorbing capacity of the bog-iron ore) has passed through the chamber K^1, the stream of gas is deflected into and through the chamber K^2, so that the latter performs the function previously performed by the chamber K^1. While sulphuretted hydrogen is being separated in K^2, a stream of air is passing through K^1; and by this means the compounds of sulphur and iron therein are so violently oxidized that sulphurous acid is produced. This acid is washed out in S. The mass in K^1 is in this manner prepared for again absorbing sulphuretted hydrogen, and the stream of gas can again be deflected into K^1, while a current of air is passed through K^2.

The washer A is traversed by the liquor flowing from the washer S, and *vice versâ*—that is to say, a single volume of circulating liquor is retained in the process, and becomes gradually charged with salt until the point of saturation is reached.

The amount of circulating liquor is so calculated that the discharge from S, used for washing out the ammonia in A, mainly consists of $\frac{NH_4}{H}>SO_3$, and is therefore highly capable of absorbing the ammonia without rendering the gas acid.

This latter point may be particularly emphasized with reference to the processes in which the ammonia is directly washed out of the gas by means of sulphuric acid. In these processes, the gas must necessarily become acid—*i.e.*, must absorb sulphuric acid; and this fact may be regarded as fatal to the utility of such processes, inasmuch as in course of time the pipes must become corroded, however much care is taken to provide lead linings. Moreover, the free acid considerably reduces the illuminating power. The Burkheiser process entirely excludes free acid, and in no way reduces the illuminating power of the gas.

The exactly neutral liquor discharged at *d* is acted on by the oxygen of the air, and yields sulphate of ammonia which is, in respect of appearance and purity, at least equal to the other sulphate. A fact favourable to the process is that nearly all kinds of coal contain sufficient sulphur for binding the whole of the ammonia.

The following summary of advantages may be made: A very considerable saving of space is effected by adopting the process; the saving in regard to space for sulphur separation alone amounting to 59·60ths. Savings are also effected in regard to purifying material, lime, steam, and water for ammonia washers. The use of protective lead is unnecessary; and the employment of sulphuric acid is entirely dispensed with.

AMERICAN ILLUMINATING ENGINEERING.

Third Annual Meeting of the Society.

In the "Journal" for the 19th ult. (p. 186), we gave a *résumé*, from the "American Gaslight Journal," of the first portion of the proceedings at the third annual meeting of the American Illuminating Engineering Society, which was held in New York towards the end of September. Further particulars have since come to hand which allow of the account being completed.

At the evening sitting on the second day of the meeting, the members were fortunate in having among them Mr. Walton Clark, who is President of the Franklin Institute and Past-President of the American Gas Institute. He briefly addressed the meeting. The only paper was that presented by Dr. C. P. Steinmetz, on the "Physiological Effects of Radiation, especially those Outside the Visible Spectrum." He stated that, in spite of the fact that daylight contains far more ultra-violet rays than do artificial illuminators, the latter are much more harmful, so that we must look for something besides ultra-violet light as the cause of eye troubles. These he divided into three classes—viz., indirect, due to impairment of colour distinction; direct, due to the power or quantity of radiation; and specific, due to high frequencies. Regarding the trouble due to the second phase of the question, the author explained that the harm done by a 4-watt lamp is greater than a 2-watt lamp, on account of the greater energy or power outside the visible spectrum which reaches the eye. The paper was discussed by several members.

The first paper at the morning sitting next day was by Mr. H. E. Ives; his subject being "Allowable Amplitudes and Frequencies of Voltage Fluctuations in Incandescent Lamps." The matter covered a test made at the Bureau of Standards in Washington. In the discussion, Mr. Fisher pointed out that a low frequency was permissible in street lighting where the intensity of illumination was low. Dr. Sharp remarked that the sensation of flicker was stronger when an illuminated object was looked at than when one looked at the lamp. The next paper (by Dr. Louis Bell) was entitled "The Principles of Shades and Reflectors." While no new ideas were brought out, an impartial statement of the facts was presented. Mr. Jones described a metal trough reflector with glass shields for a lamp, which he said gave practically uniform illumination. The paper was also discussed by Messrs. Wolhauer, Lansingh, and Owens. The concluding paper of the morning sitting was entitled "Standard Relations of Light Distribution," by Mr. A. J. Sweet. Our contemporary says "this was a most ambitious paper, and the work presented should prove of value to those who are dealing with practical problems of lighting installations." Mr. Woodwell stated that the specialist should be encouraged to take up each separate problem rather than use general rules as suggested by the author. Mr. Hopton thought the curves shown in the paper would give normal values which would be too high for residence lighting; and Mr. Thurston Owens said the reverse was the case with commercial lighting. Mr. Elliott congratulated the author on bringing forward suggestions for standardization, of which the art was badly in need.

The concluding sitting was opened with a paper upon "The Problem of Heterochromatic Photometry" by Mr. P. S. Millar. Owing to the fact that modern light sources have such varied colour characteristics, this subject is one of increasing importance; and the paper should be of considerable assistance to those who are endeavouring to solve the problems connected with it. Dr. Steinmetz said the measuring of lights of decided colour could be done by three operations: By using the bolometer to determine the radiation, a photographic plate for the actinic rays, and a flicker photometer for the effects of after-image. He recommended the use of an illuminometer, having a reading card with black letters on a white background for low intensities, and white letters on a grey background for high intensities. Dr. Bell stated that with the last-named instrument the trouble would be that the result would be one of adaptation rather than of perception. Mr. Sweet described a tungsten lamp which was constructed to meet the necessary requirements of a standard. The next matter taken up was the conclusion of the discussion on the papers of Drs. Ives and Simonini, which had been interrupted the previous day. In this debate, Dr. Steinmetz gave it as his opinion that the spectrum of the single firefly would show an even narrower area than that produced from the large number used by Dr. Ives. He further discussed the earliest, as well as largest, application of selective radiation; the Welsbach mantle showing that the greenish colour was characteristic of this phenomena. The paper by Mr. Norman Macbeth, on "Some Results Obtained through Illuminometry," contained a great number of tests of

illumination by means of mantle gas-burners. No conclusions were drawn by the author, and the subject was not discussed. Mr. L. B. Marks then read a paper on "Factory Lighting," which showed in great detail the conditions existing under both artificial and natural light. A short discussion followed. A paper on "Operating Efficiencies of Some Commercial Installations of Lighting Systems," by Mr. A. L. Eustace, was then presented. The object of the author in endeavouring to show that commercial conditions greatly change the situation regarding the efficiency of prismatic glassware, was successful. The paper on "Tests of Moore Tube Lighting Installations in the New York Post Office," prepared by Mr. E. P. Hyde and Mr. J. E. Woodwell, was omitted, as the authors were not present. The final paper on "Tests of a Moore Tube," by Mr. C. H. Sharp and Mr. P. S. Millar, was read by the latter. The data covered tests made by the authors for the Association of Edison Illuminating Companies.

In connection with the meeting, an interesting exhibit of lighting appliances was held in a building close to the assembly hall. It was notable for the elaborate displays of individual exhibits, rather than for the number of exhibitors.

THE EVOLUTION OF THE GAS-ENGINE.

It has already been reported in the "Journal" [see Vol. CVI., p. 968] that a paper on the development of the gas-engine was read by Herr Joh. Körting, of the firm of Körting Bros., of Düsseldorf, at this year's meeting of the German Association of Gas and Water Engineers. In the first instance, the Council of the Association had approached Dr. W. von Oechelhaeuser, the Managing-Director of the German Continental Gas Company, asking him to give an address at the meeting comprising a review of the development of the gas-engine during the fifty years which had elapsed since the Association was founded. The occasion was specially appropriate for the delivery of such an address, because approximately fifty years have passed since the gas-engine was first evolved in a form suitable for practical work. Unfortunately, Dr. von Oechelhaeuser was unable to devote the necessary time to the preparation of such an address; and the Council of the Association thereupon asked Herr Körting to read a paper on the subject, to which request he acceded, as already reported. At the meeting a large number of photographs and drawings of various types of gas-engine, illustrating its evolution up to the present day, were thrown on the screen. These illustrations were reproduced in two recent numbers of the "Journal für Gasbeleuchtung," when the text of Herr Körting's paper was given. Much of the historical matter contained in the paper will be found in the latest editions of the text-books on the gas-engine by such well-known authorities as Mr. Dugald Clerk and the late Mr. Bryan Donkin. It is therefore unnecessary to do more than briefly indicate the ground covered by Herr Körting in his paper.

The first gas-engine constructed and put to practical use is ascribed to Herr C. Reithmann, a watchmaker of Munich, whose death was reported in the "Journal" a few months ago [see Vol. CVII., p. 372]. In the year 1852, he constructed a gas-engine, which was fed with hydrogen, for driving machinery in his workshop. The hydrogen proving too costly a fuel, he converted the engine so as to make it suitable for the consumption of coal gas; and in the year 1858, it was started in operation in connection with the ordinary Munich gas supply. Hearing, in 1860, that there was a movement in Paris for the commercial manufacture of gas-engines, he applied for, and obtained, a patent in Bavaria for his engine; but, lacking financial support, he allowed the patent to lapse in two years. In 1873, Reithmann devised a new gas-engine of the four-cycle type, which remained in use in the eighties in his workshop. He was thus the first to make practical application of the four-cycle, the theory of which had been elaborated in the sixties by M. Beau de Rochas. In 1860, Lenoir had produced his gas-engine with a double-acting cylinder somewhat resembling that of a steam-engine. The oil consumption, however, of this engine was extremely heavy, and the working charges very high. This engine should apparently be ascribed to M. Hugon, the Manager of one of the gas-works in Paris.

In 1867, the firm of Langen and Otto brought out their atmospheric gas-engine, which, notwithstanding its noisiness and its impracticability in large sizes, came into extensive use. Up to 1878, the firm of Langen and Otto had constructed 4500 engines of this type. The gas industry endeavoured to further the introduction of the gas-engine in every way; and at Minden, in 1877, the gas undertaking went so far as to offer to bear the prime cost of installing gas-engines for industrial use. In the later half of the seventies, N. Otto, a member of the firm of Langen and Otto, brought out his new gas-engine, which for years served as the type for other designers. By the year 1880, 3000 Otto engines had been constructed, and by 1889 30,000 were in use. The Otto engine, as is well-known, is of the four-cycle type. In 1879, Mr. Dugald Clerk exhibited in London an engine working on the two-cycle principle, which becomes important historically in view of the recent development in the construction of large gas-engines of the two-cycle type.

It is unnecessary to refer to the gradual improvements which were embodied in the Otto type of engine for ordinary use. At the beginning of the eighties, gas-engines of large power began to be constructed. A 60 H.P. twin-cylinder engine was introduced in the sugar refinery of Elsdorf in 1881 consuming coal gas made in the private works of the refinery. The construction of gas-engines of larger size followed on the development of the gas-producer by Dowson. It is interesting to note that it was about the middle of the eighties that the gas-engine was first applied for pumping water for town supplies, for which purpose it has since been so largely adopted on the Continent. Then followed the use of the gas-engine for driving dynamos for the supply of electric current. One of the first instances of this use was afforded by the adoption, by Herr W. von Oechelhaeuser, in 1886, of gas-engines aggregating 160 H.P. for the electric supply station at Dessau of the German Continental Gas Company. These engines were supplied with coal gas. Subsequently, however, when the power required had considerably increased, coal gas was superseded at the Dessau station by producer gas; and at the present time there are at these works two suction-gas engines each of 600 H.P.

At the beginning of the nineties, the tendency was rather to multiply the number of cylinders than to increase the diameter of the cylinder with a view to obtaining greater power. But the efforts of Messrs. Körting Bros. and of Herr von Oechelhaeuser and others, resulted in the construction in the second half of the nineties of gas-engines with cylinders of large diameter. A 200 H.P. Junkers engine, in the design of which Herr von Oechelhaeuser had collaborated, was erected in the works of the Berlin Anhalt Engineering Company, and was fed by coal gas. Messrs. Körting Bros. constructed 600 H.P. four-cycle engines which were brought into use for the consumption of blast-furnace gas in May, 1898. Meantime, however, French engineers had succeeded in constructing four-cycle engines of 600 H.P. with a single cylinder. In 1899, these engines were introduced at Seraing; and the following year it was stated that sixty engines of this type had already been constructed. They were followed by a 700 H.P. engine, with a single cylinder, constructed by a Nuremberg firm.

All these engines had been of the four-cycle type; but it now appeared that, if the power of a gas-engine was to be further increased to a considerable extent, economy of space would be attained by the use of double-acting engines of the two-cycle type. The cylinders would be considerably smaller, and the working would be more uniform than that of engines on the four-cycle principle. Messrs. Körting Bros. constructed an experimental engine of 400 H.P. on these lines; and two such engines of 600 H.P. were exhibited at the Düsseldorf Exhibition in 1902. At the same exhibition also, there was a single-acting four-cycle engine, with four cylinders, of 1200 H.P., made at the Deutz Gas-Engine Works. Concurrently the Oechelhaeuser two-cycle engine had been developed. In this type there were two pistons working in opposite directions in one long cylinder. Of Messrs. Körting's double-acting two-cycle engines, installations aggregating over 200,000 H.P. are now in existence. In 1903-04, the Lackawanna Steel Works in the United States already had one installation of these two-cycle engines with a total of 40,000 H.P.

Herr Körting next went on to refer to installations of gas-engines in use in connection with gas and water works. Among water-works for which the power is obtained by gas-engines may be mentioned those at Dantzig, equipped in 1903, and those at Worms, in which engines directly coupled with the pumps were installed in 1906. Large installations are also in existence for the pumping of sewage. At Wilmersdorf, Körting two-cycle gas-engines, totalling 300 H.P., are coupled directly with the pumps. These engines, like those in use at the Dantzig and Worms Water-Works are intended for the consumption of coal gas; but the Wilmersdorf engines are adaptable, if required, for consuming producer gas. Plant at the Berlin sewage-pumping station, erected in 1907, also consumes coal gas.

The remainder of Herr Körting's paper deals chiefly with the development of engines for the consumption of liquid fuels—*i.e.*, petroleum oil, alcohol, and petrol. Illustrations are given of a 70 H.P. petrol engine with eight cylinders, as used on the German military airships, and of a two-cycle four-cylinder petroleum motor, which is in use in the German submarines.

In the discussion after the reading of the paper, reference was made by Herr Terhaerst, the Manager of the Nuremberg Gas-Works, and by Herr Elvers, of Wandsbek, to engines of the Diesel type working at Halle and Wandsbek with tar oil as fuel in place of petroleum. In the second case, an addition of 5 to 10 per cent. of petroleum gas oil is made to the tar oil before use. The tar oil is obtained by a single distillation of gas-works tar; and the cost of fuel for the engines is said to be about one-third of what it would be if petroleum were used. In considering this figure, however, regard must be paid to the effect of the heavy import duty on petroleum oils in Germany.

At the conclusion of the discussion, Herr Körting received a hearty vote of thanks for the interesting paper he had presented.

"Gas-Works Directory and Statistics" for 1909-10.—We have received from the publishers, Messrs. Hazell, Watson, and Viney, Limited, the above-named Directory. Having reached its thirty-second year, the work is too well known to require more than a brief notification of the publication of the issue for the year 1909-10, the contents of which have been revised to August last. As usual, the statistics are preceded by lists of the Chairmen, Managers, Engineers, and Secretaries, as well as of the Technical Associations connected with the gas industry. The price of the book is 10s. 6d. net.

MANCHESTER DISTRICT INSTITUTION OF GAS ENGINEERS.

General Meeting at St. Helens.

THE One Hundred and Fifty-Seventh General Meeting of the Institution was held at St. Helens on Saturday. There was a larger attendance than usual; 122 members being present. On arrival at St. Helens, they at once proceeded to the Corporation gas-works for an inspection of the new installation of the Glover-West vertical retorts. Mr. Samuel Glover and his colleague, Mr. John West, explained the working of their invention, and answered the various questions put to them.

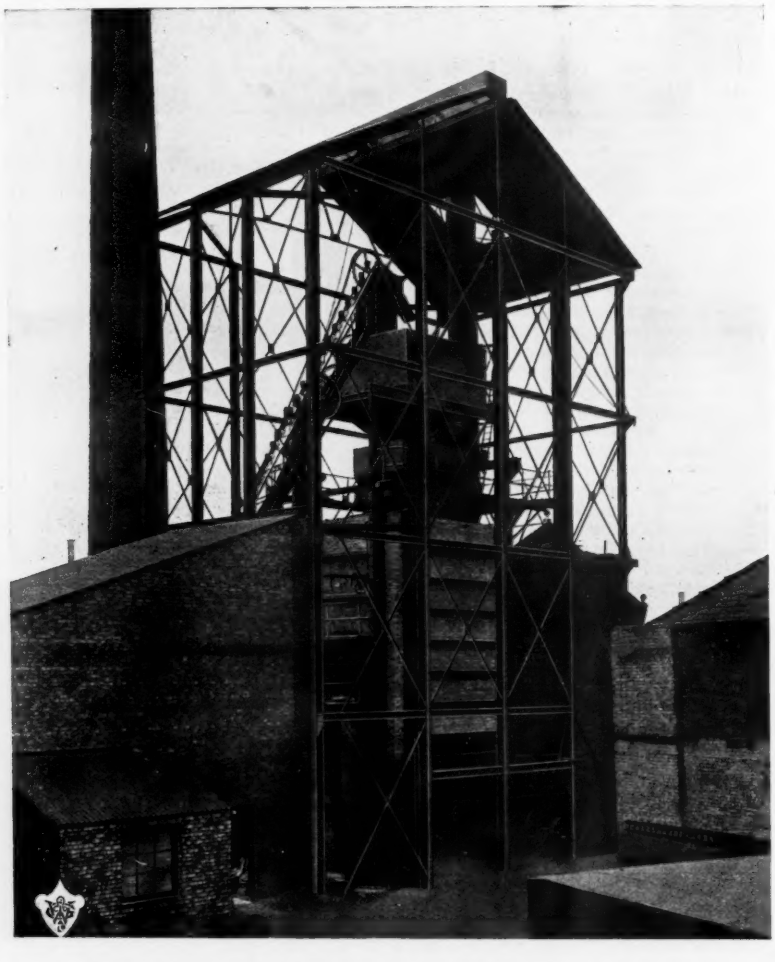
HOSPITALITY OF THE SHEFFIELD GAS COMPANY.

Later in the day, at the Town Hall, the members were the guests, at luncheon, of the Chairman and Directors of the Sheffield United Gas Company. Mr. J. W. MORRISON (Sheffield), President of the Institution, was in the chair, and those supporting him included Mr. J. W. Helps (Croydon), the President of the Institution of Gas Engineers; Mr. James Crooks, the Chairman of the Gas Committee of the St. Helens Corporation; Mr. W. Langford (Longton), the President of the Midland Association; Mr. Thomas Newbigging (Manchester); and Mr. W. Whatmough (Heywood), the Hon. Secretary of the Institution.

A COMPLIMENT TO ST. HELENS.

After the toast of "The King" had been honoured,

Mr. H. KENDRICK proposed "The Mayor and Corporation of St. Helens," coupling with the toast the name of Mr. Crooks as representing the Mayor, who was unable to be present. In the course of his remarks, he paid a high compliment to those who had built up the chief industries of St. Helens, and also to those who were responsible for the government of the town, which he said held an enviable position, with its rates at only 6s. 5d. in the pound on a population of about 84,000. With regard to its gas undertaking, St. Helens held a unique position in that part of Lancashire; and Mr. Glover and the Corporation were to be congratulated on being able to supply gas at the price they did.



Setting of Eight Vertical Retorts on the Glover-West System at St. Helens.

Mr. CROOKS, in responding, said he was pleased, on behalf of the Mayor and Corporation, to welcome the members of the Institution to St. Helens. Their visit was not only a compliment to Mr. Glover, but to the town; and he was gratified to know they had at St. Helens something which was of interest to the visitors.

Mr. S. GLOVER, also responding, said he had served the Corporation of St. Helens ever since they acquired the gas undertaking. He was associated with the works before they were purchased; and he thought the Corporation deserved the compliment which had been paid by Mr. Kendrick for the way in which they managed the affairs of the town. They looked upon the gas undertaking from a purely commercial point of view; and it was managed in a business-like way in the interests of the consumers. To this he attributed its success.

The PRESIDENT gave the toast of "Kindred Associations," and expressed pleasure at the presence of Mr. Helps, the President of the Institution of Gas Engineers, and Mr. Langford, the President of the Midland Association.

Mr. J. W. HELPS, replying, said he was pleased to attend such gatherings, because they gave him the opportunity of meeting men he would not otherwise meet in the South of England.

Mr. W. LANGFORD, in his response, remarked that, as the result of their visit to St. Helens, they would go away with new ideals.

THE PROBLEM OF CARBONIZATION.

Mr. T. NEWBIGGING (Manchester), on rising to propose the toast of "The Sheffield United Gaslight Company," was greeted with hearty applause. He said those present had seen a great deal to admire; and he desired especially to congratulate Mr. Glover and Mr. West on their setting of vertical retorts. As they all knew, these were the very foundation at the root of gas manufacture—he meant carbonization. What they had seen that morning had been intensely interesting to them as gas engineers. If there was one thing he admired more than another in Mr. West, it was his tenacity of purpose in all that he undertook. He showed this many years ago, when he was at Maidstone; and he still displayed it. He felt assured that Mr. West and Mr. Glover had gone far to settle the difficult problem of carbonization in vertical retorts. In their further efforts towards perfecting the machinery, he (Mr. Newbigging) had no doubt as to their efforts being successful. Inventors did not always get the encouragement they deserved—especially the poor inventor; but he hoped that in the present case Mr. Glover and Mr. West would reap all they expected and all they deserved from their invention, and have good health for many years to enjoy their reward. He was very glad to know that the Manchester Corporation had now determined to have an

installation of Glover-West retorts on a considerable scale at one of their stations. He thought also that a great deal of credit was due to the Burnley Corporation and their Gas Manager, Mr. Leather, for leading the way. As to the Woodall-Duckham system, he could only hope it would be a success, as well as the one they had seen that day, because it was "very nice to have two strings to their bow." (Laughter and applause.)

The PRESIDENT, replying to the toast, stated that when he mentioned the matter of the St. Helens visit to his Directors, they at once told him to "go ahead." This showed the good feeling existing between the Directors and himself; and he hoped it would continue for many years to come. His was a progressive Company; and he was looking forward to the day when they could sell gas at 1s. per 1000 cubic feet. He thought it would come to that. As it was, they were now at 1s. 2·9d. per 1000 feet.

The Business Meeting.

The business meeting which followed the luncheon was also held in the Town Hall. Mr. MORRISON again occupied the chair. After the minutes of the previous meeting had been confirmed, a discussion took place on the paper read at the last meeting by Mr. Edward A. Harman, of Huddersfield, on the "Slot-Meter System," which was published in the "JOURNAL" for May 25.

DISCUSSION ON MR. HARMAN'S PAPER ON THE "SLOT-METER SYSTEM."

The PRESIDENT said it would be remembered that the discussion on the paper that Mr. Harman read at the May meeting was postponed owing to want of time. He hoped that the lapse of time had not diminished the interest in the paper, and that members, having had time to think the subject over, were now well prepared to discuss it. There were, he added, four points in the paper that struck him as being exceptionally good. The first was that the Huddersfield Corporation put in gas-services and fixed meters free of charge. This must, of course, be a great inducement to people to take gas. The second point was that the duties of the collector were arranged so that fraud was obviated—a matter that would appeal to all of them having slot-meters in use. The third point was that at Huddersfield they had an excellent system of getting rid of their coppers from the slot-meters. The fourth was that the discount rebate was a very commendable arrangement and one that made consumers interested in the money in the meter-boxes, and therefore lessened robbery. He did not think, however, that Mr. Harman had clearly stated the present selling price of gas by their slot-meters. The author mentioned that in April, 1908, the quantity of gas for a penny was increased to 40 cubic feet, and a discount of 3d. in the shilling allowed. He thought Mr. Harman meant that 30 cubic feet were sold for a penny and a discount of 3d. in the shilling allowed, which was equivalent to giving the consumer 40 cubic feet for a penny. He also noticed that the author sold gas to ordinary consumers at 2s. per 1000 cubic feet, less 5 per cent. for cash, equivalent to 1s. 10¾d., and that his price to slot-meter consumers worked out at 2s. 1d.—the difference being 2¼d., which, on Mr. Harman's average consumption of 13,700 cubic feet per slot-meter, amounted to 2s. 6d. a year. This seemed to him (Mr. Morrison) to be a very small figure to compensate for the extra cost of meters, collecting, damage, and repairs. He could hardly think it possible that an extra revenue of 2s. 6d. per meter per annum could pay. If not, then the ordinary gas consumer was paying more than he should do. If Mr. Harman went more fully into all the charges for providing slots, compared with the ordinary meters, he would find that the difference in the selling price should be nearer 6d. per 1000 cubic feet than the 2¼d. he charged. It would have been more satisfactory if Mr. Harman had given the actual cost of collecting per slot-meter consumer, against an ordinary consumer using the same sized meter. He would like to know how often the collections were made from the slot-meters, and to what extent introducing these meters had affected the number of 2-light and 3-light ordinary meters in use, and how many ordinary meters of this size he had still in use, in addition to slot-meters. He (Mr. Morrison) found that at Sheffield they had 72,270 2-light and 3-light meters out of a total of 93,681, or 77 per cent. The average annual consumption in Sheffield of 2-light meters was 11,757 cubic feet, and of 3-light 17,067 cubic feet. They had no slot-meters in use; but he thought their sales of gas were well maintained. In Sheffield, they had a population of 450,000; and as they had 94,000 consumers, it would be seen that they had 4000 more than if they divided the population by five per house as was generally done. This demonstrated, he thought, that with cheap gas slot-meters were really not necessary.

Mr. S. GLOVER (St. Helens) observed that it might have been thought, from what he said at Bamford, in seconding a vote of thanks to Mr. Harman for his paper, that he was to take up the cudgels against slot-meters and Mr. Harman. That was not so. Mr. Harman's paper had served the purpose he had in view, and a very useful purpose too. In bringing the subject forward, Mr. Harman had made many of them review their position relative to the small consumer. Those present would be assured of his (Mr. Glover's) interest in the subject, when informed that in St. Helens £21,000 was collected last year without the loss of one penny upon the total gas sold through slot-meters, and that from about 13,000 meters they had in use. This was because their system was good. At the same time, he thought Huddersfield had been very successful indeed in the application of the slot-meter system to meet the wants of the small gas-consumer. But circumstances altered cases; and each of them had different conditions to consider in getting at the small consumer. In some places—such as Sheffield and Oldham—it was not thought necessary to have the slot-meter system; but in other towns it served a useful purpose, and increased the consumption of gas. (Hear, hear.) Members would recall the difficulty that they had in the beginning, and that the making of slot-meters had almost to be forced upon the meter manufacturers. He thought it had been proved that those opposing the system were short-sighted in their views, and that slot-meters were very useful instruments in the hands of gas supply companies and corporations to-day. (Hear, hear.) In forming a comparison with Huddersfield methods, he (Mr. Glover) was led to make inquiries of several of his friends; and the result had been to confirm his confidence in the system they had in operation in St. Helens. Speaking generally on the subject, Mr. Glover held they should make it a *sine qua non* to have correct and reliable meters, set by means of changeable crown-wheels to the price fixed upon. They ought to avoid fostering any unsound commercial principles in these transactions such as rebates or anything which pandered to the notion of getting something for nothing. (Hear, hear.) The amount of money taken from the slot-meter should correspond exactly with the gas consumed and a receipt given each time. If there should be any balance, this ought to be replaced in the box. Each transaction should be complete; and there ought to be no lumping together of "shorts" and "overpluses." With proper and reliable meters, there need be none of this. There ought to be frequent collections, and the money counted and checked in the office with the receipt-book. It was undesirable for collectors to go about the town to get the copper changed by some friend. At St. Helens, the money was taken to the Gas Offices, where they had a coin-counting device which made the copper up in 5s. packets (four making the pound); these being subsequently taken to the bank. There should be no system of hiding the position from each inspector, or the takings from the consumer. An open, simple, business-like system was the one to give lasting satisfaction. He agreed with Mr. Harman that this class of business was worth looking after; and if the consideration of the paper helped them to do it better than formerly, then he was sure Mr. Harman would be gratified. (Hear, hear.)

Mr. E. ALLEN (Liverpool), having complimented Mr. Harman upon the practical character of his paper, said he did not know what some of them would have done but for the advent of the slot-meter system. It was in 1892 that they started the system in Liverpool; and though it had grown considerably in the interval, they had not lost business from the ordinary meters. The increase in the consumption had been largely taken up by the slot-meters in the seventeen years. Of these, they had nearly 58,000; while the ordinary meters numbered between 76,000 and 77,000. So that the former had become an important proportion of the meters in use in the district. In 1904, they introduced cookers for slot-meter customers, and this had been much appreciated; the number in use now being 13,000. He was quite sure the working class had received great benefit by the introduction of this system in the cities and towns. One great reason why the working man liked the slot-meter was because there was no deposit to pay. As those present were aware, the demand for a deposit was a great bar to many a poor man who wanted to have gas in his house. The slot-meter got over this difficulty; and by it they secured consumers they would not otherwise have. Of course, the system had its disadvantages; and an important one was the robbing of the meters. In this respect, St. Helens seemed to be in a very happy position, from what Mr. Glover had said. Unfortunately they in Liverpool had a number of thieves who robbed slot-meters; and sometimes people, to finish up a "spree," would break open the meter to get the money it contained. He thought Mr. Harman was right in saying there should be an agreement with the consumer binding payment for all gas consumed through the meter. This he considered most important. As to Mr. Glover's suggestion about changeable crown-wheels, it might be all very well in St. Helens, where the number of meters was small, but with Liverpool it would be a big thing to change nearly 60,000 meters.

Mr. R. WATSON (Doncaster), referring to the question of costs in connection with slot-meter gas supply, said the President had suggested that the extra amount received per 1000 cubic feet over the ordinary price through slot-meters in Mr. Harman's case was only 2½d., whereas the extra cost of distributing gas was much more. In his own case at Doncaster, with conditions somewhat similar to those of Huddersfield—that was to say, the supply of service-pipe, meter, and boiling-ring, but no fittings—the extra amount received through slot-meters was much the same as Mr. Harman's. The average gas consumption for these meters was 11,000 cubic feet, and for all ordinary meters 30,000 cubic feet per annum. The annual cost of main and meter maintenance amounted to about 5d. per consumer; and this worked out per 1000 cubic feet for the two classes of meter indicated that the maintenance cost about ¼d. more for slot than for ordinary meters. The capital cost of mains (about 7 yards per customer), service-pipe, meter, &c., ran to some £4 5s. per customer; and interest and sinking fund on this amount came to 5·4d. per 1000 cubic feet for slots and 2d. for ordinary meters—a difference of 3·4d. The two charges coupled with the extra expense of collection could be taken to be about 4½d. per 1000 cubic feet. As against this, it should be borne in mind that slot-meter custom was obtained principally off gas-mains already existing, and therefore

the capital charge about 1½d.) for new main-pipe per 1000 cubic feet per slot-meter was saved. For practical purposes, this might be credited against the 4½d.; and the extra cost became reduced to 3d. This, by coincidence rather than by calculation, had long been the additional charge made for slot-meter gas at Doncaster. There were other pecuniary points which should also be remembered; as, for instance, the fact that the slot-meter customer took his gas rather more equally throughout the year than did many of the ordinary consumers—thereby lessening the necessity of disproportionate extension of plant.

Mr. HARMAN, in his reply, said it was not his intention in the paper to set out a system that would apply to all places. It was more to record what had been done in Huddersfield. He was quite aware that what might serve in one place would not do for another. He did not claim that the system they had at Huddersfield was by any means a perfect one; but he did say his Committee had adopted the very best system applicable to the town. The question about the difference in the price of gas between the slot-meter consumers and the ordinary consumers was one to be settled locally. As to the cost of collection, he pointed out in his paper that if the monetary value alone was taken into account the cost might appear heavier. To be strictly correct, the basis of comparison should be per consumer; and if this was considered, then it could be shown that the cost of the slot-meter customer for inspection and collection was practically the same as for the ordinary consumer. In conclusion, Mr. Harman said he hoped his paper and the expression of opinion given that day would be of advantage to them in dealing with the subject of the slot-meter system.

ELECTION OF OFFICERS.

The report of the Scrutineers (Messrs. Booth and Pickles) on the election of officers was next presented, as follows:—

President.—Mr. H. Kendrick, of Stretford.
Vice-Presidents.—Mr. Robert Watson, of Doncaster; and Mr. Samuel Glover, of St. Helens.
Hon. Treasurer.—Mr. T. Newbigging, of Manchester.
Hon. Secretary.—Mr. W. Whatmough, of Heywood.
Committee.—Mr. Harold Barker, of Buxton; Mr. John Bond, of Southport; Mr. E. A. Harman, of Huddersfield and Mr. E. H. Hudson, of Normanton.
Auditors.—Mr. W. L. Donaldson, of Lymm; and Mr. Charles Potts, of Hyde.

Mr. KENDRICK, acknowledging the compliment paid him by his election as President, said it was an office he had not sought, and one that he felt he had not earned. What little work he had been able to do for the Association was amply rewarded at the time he gave up the secretaryship. He thanked the members for the honour done him, and trusted he would be able to show twelve months hence how much he had appreciated it.

NEW MEMBERS.

The following new members were elected: Mr. Harold Smith, Bingley, Yorks.; Mr. Sidney T. Smith, Leek, Staffs.; Mr. Lawrence Hislop, Uddingston, N.B.; Mr. Chas. F. Broadhead, Middleton, Lancs.; Mr. Albert C. Shortt, Kirkheaton, Huddersfield; Mr. Walter Frost, Matlock Bath; Mr. William Prince, Southwell, Notts; Mr. Edwin C. Riley, Gas-Works, Great Western Railway Company, Swindon; Mr. F. Arnott, Gaythorn, Manchester; Mr. Geo. W. Fligg, Dewsbury; Mr. Harry Walker, Chapel-en-le-Frith; Mr. Benjamin Goddard, Glossop; Mr. Harold Davies, Brighouse; Mr. John H. Hill, York; Mr. Chas. S. Shapley, Neepsend, Sheffield; and Mr. Walter Shadbolt, Llandudno.

Mr. S. GLOVER (St. Helens) read the following paper:—

VERTICAL RETORTS AT ST. HELENS.

The installation of vertical retorts which you have done us the honour of coming to St. Helens to-day to inspect, has been erected for the purpose of settling in a practical manner the question of whether retorts set vertically could compete successfully with horizontal or inclined retorts, both from the point of cost of working and make of gas per ton of coal. The installation was therefore coupled up to a complete and separate gas-making plant, and has been in use for upwards of twelve months, during which time many experiments and extensive tests have been carried through, which have been sufficient to satisfy the author that extensions of the gas-making plant to meet the future needs of St. Helens will be on the lines of this installation.

Saving of ground space was an important factor in this case, in addition to our desire to secure all the other advantages that the vertical system provides. The manner in which we can make use of the small area of land that will be made available by removing the old plunge baths is shown on the plan ["JOURNAL," June 8, p. 635] from which it will be seen that 64 retorts can be erected on land which would not accommodate a horizontal house with the necessary floor-space. The small area required for these settings of verticals will be a valuable asset in favour of verticals in cases of small available areas. In speaking of the vertical system, the author would have it clearly understood that it is intended to convey the idea of vertical retorts worked on the continuous system, and not those intermittently charged.

The author's attention was first attracted to the possibilities of the use of vertical retorts in the manufacture of coal gas when he was visiting some shale-oil works in Scotland with the late Mr. William Young; and inspirations then received have not been allowed to wane. Different combinations were thought-out to suit various purposes. The installation inspected to-day is the material expression of some of the ideas conceived by those responsible for its construction and working; and it is offered for your consideration as embodying in the simplest manner the aspirations of gas engineers for a more intelligent method of conducting the important operation of the destructive distillation of gas-making coals, in the various forms in which coals are marketed to-day. The objects aimed at were, briefly: To simplify the process of carbonizing coals, and to increase the output per retort and reduce the mechanical operations; to increase the make of gas per ton; to improve the working conditions of retort operators, and avoid as much as possible dust, smoke, and steam being evolved into the atmosphere; to get more efficiency out of the fuel used in heating the settings, and to prevent loss of heat by avoiding the discharging of red-hot coke from the retorts and without saturating it with water. To secure these desired objects, and to maintain the larger volume of gas of good calorific value and suitable illuminating power, we were satisfied, if need be, to sacrifice something on the tar, the nature of which we knew would be changed. We expected to realize an increase in the production of ammonia per ton of coal carbonized to find a reduction in the quantity of cyanide compounds, and also much less naphthalene. It is gratifying to have found all our expectations realized, and more.

In designing the installation, we have kept in mind the desirability of having control of the heating of the vertical retort in horizontal sections, as well as the rate of travel of the charge downwards through the retort; also the temperature of the coke discharged. These objects have been attained in a complete and simple manner, and the heat efficiency of the setting is very high. Working with this setting has proved to us that, with vertical retorts heated and operated in accordance with the principles here carried out, improved results can be realized over those obtained with horizontal retorts from the poorer classes of gas coals, while much higher results can be obtained from the better classes of gas coals. The nature of the coke from both classes of coals is altered. It is of a closer texture, is more valuable for many purposes for which coke is now used, and realizes a better price in the market.

In the endeavour to simplify the mechanical work of operating vertical retorts, a process of charging by gravitation has been evolved here, which works in an entirely satisfactory manner. This has helped to satisfy the author that the vertical retort is now such an instrument as can be put into the hands of the carbonizing engineer to enable him to get better results per ton of coal. It may be that in the majority of places it would be most economical to work each coal for the making of the largest volume of gas per ton, and, if necessary, to enrich up to the standard required the gas so obtained, as the gas evolved from coal carbonized in vertical retorts is of such a composition as develops, on combustion to the full, the enriching materials put into it. Enrichment with benzol can be secured at the present time at about ¼d. per candle per 1000 cubic feet. There is a very low percentage of inert gases in the gas produced from these retorts.

The objects aimed at have been secured along with several other advantages, and with a lower consumption of fuel than with horizontal retorts. The tar is not decreased in quantity, and it is of a different quality, being much more nearly free from carbonaceous matter. The absence of long connecting-pipes between the retort and the gas-main, while it may seem a small matter to some, is one of the helpful features of these retorts. The higher make of gas per retort is a very striking feature of the system. The through-put of coal per retort is very greatly increased—thus securing for the future that a very much larger output of gas can be provided on a given ground space, and in case of new works with considerable saving of expenditure on land and buildings. By means of these retorts, gas will be manufactured in future under improved conditions as to labour, and at a considerably reduced cost.

When it was decided to hold this meeting at the St. Helens Gas-Works to inspect the vertical retorts, it was arranged that, after Dr. Colman had completed his series of tests, a long and continuous test with two kinds of coal used on these works should be commenced, and should continue up to the date of the meeting. This test was commenced on the 28th of September with a combined mixture of washed nuts and fine slack, and continued up to Thursday, Oct. 28; the results being as follows.

Test with Washed Nuts and Fine Slack Coal of this District with Eight Vertical Retorts, 20 Feet Long.

Total coal carbonized containing 5 per cent. of moisture for which no allowance has been made	622 tons 9 cwt. 0 qrs.
Coal carbonized per retort per 24 hours	2 ,, 10 ,, 3 ,,
Total gas produced (N.T.P.)	7,131,738 cubic feet
Gas made per ton	11,457 ,,
,, per diem	237,724 ,,
,, per retort per diem	29,715 ,,
,, per foot of retort per diem	1,485 ,,
Illuminating power ("Metropolitan" No. 2 burner)	14·83 candles
Calorific value (gross)	575·0 B.Th.U.
,, ,, (net)	512·1 ,,
Coke (dry) produced per ton of coal	13·97 cwt.
Fuel (dry) per 100 lbs. of coal carbonized	12·39 lbs.
Tar (free from liquor) per ton of coal	12·9 gallons
Ammoniacal liquor (10-oz.) per ton of coal	42·7 ,,
Equivalent to sulphate of ammonia	35·9 lbs.

The cost for labour [given below], after the coal is delivered into the bunkers, includes feeding the coals into the retorts, discharging the coke from the bottom of the retorts into the coke-barrows, and wheeling and tipping it into the coke-yard, attending to the producer, and looking after the driving-engines, exhauster, and pump. In fact, everything in connection with the plant and works is carried out by one man per shift; and as his time is only partially occupied in attending to the retorts, he could undertake two beds, and wheel the coke to the yard, &c., if the duty of looking after the works were taken off him. If coke-conveyors were used, one man could look after three beds of retorts and upwards; and inasmuch as some of the retorts now being erected will carbonize about 3 tons of coal per retort per day, the labour per ton will be very materially reduced.

During this test of 30 days' duration, with the one setting of eight retorts, one man per shift of eight hours has been employed, and the cost per ton and per 1000 cubic feet is as follows:—

	Capacity.		
	Per Retort.		Per Setting.
Coal carbonized in 24 hours.	2·58 tons	..	20·7 tons
Gas made in 24 hours . .	29,715 cub. ft.	..	237,724 cub. ft.
	Cost.		
	Per Ton.		Per 1000 C. Ft.
Wages with three shifts per 24 hours—			
Three stokers at 5s. 6d. per day each = 16s. 6d . .	9·5d.	..	0·83d.
Or if, as in some works, only two shifts were employed, the cost would be, with two shifts per 24 hours—			
Two stokers at 5s. 6d. per day each = 11s. . . .	6·3d.	..	0·55d.

The cost for labour for working two settings of eight retorts, each carbonizing 3 tons of coal per retort per 24 hours, would be as follows:—

	Capacity.		
	Per Retort.		Per Setting.
Coal carbonized per 24 hours	3 tons	..	48 tons
			Cost per Ton.
Wages with two shifts per 24 hours—			
Two stokers at 5s. 6d. per day each = 11s.			2·750d.
Or with three shifts per 24 hours—			
Three stokers at 5s. 6d. per day each = 16s. 6d. . .			4·125d.

Where coke-conveyors are used, the cost of labour for working three settings of eight retorts and upwards, carbonizing 3 tons of coal per retort per 24 hours, would be as follows:—

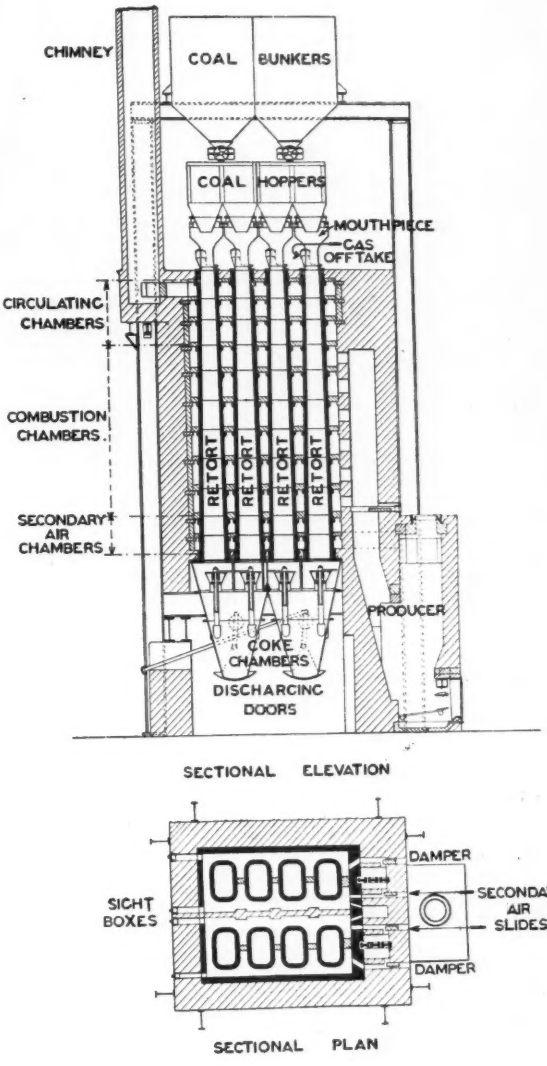
	Per Retort.		Per Three Settings.
Coal carbonized in 24 hours	3 tons	..	72 tons
			Per Ton.
Wages with two shifts per 24 hours—			
Two stokers at 5s. 6d. per day each = 11s. for every three beds			1·833d.
Or with three shifts per 24 hours—			
Three stokers at 5s. 6d. per day each = 16s. 6d. per day for three beds			2·750d.

It was hoped to make a test with the same mixture in the old retort-house with West's manual machinery; but it was found that this could not be carried out conveniently at this late period of the year. However, for your information, it may be stated that this mixture would produce about 10,250 cubic feet of gas.

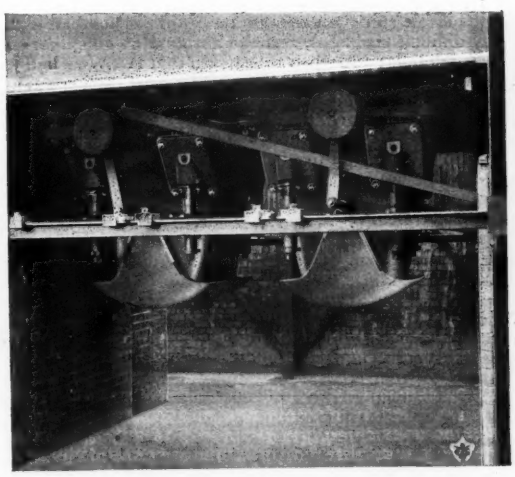
Your attention is particularly called to the large volume of gas produced and the tonnage of coal passed through each retort per day of 24 hours, and you are asked to compare the same with the working results of the intermittent or Dessau system, as taken from the best examples published in the Technical Press. The following extracts are taken from the "JOURNAL OF GAS LIGHTING," on information given by Mr. Hayman and Dr. Bunte. In the paper read by Mr. A. F. P. Hayman before the Institution of Gas Engineers [see "JOURNAL" for June 23, 1908, p. 799, Table II.], it states that "at Mariendorf, 84 retorts carbonize 100 tons per 24 hours, or approximately 24 cwt. per retort per 24 hours." As to the Mariendorf tests, Dr. Bunte, in his report to the Research Committee of the German Gas Association, dated June, 1908, states "that the average weight of coal carbonized per retort per 24 hours is 22 cwt. 98 lbs. with steam and 25 cwt. 61 lbs. without steam." In the Zurich tests, "the average weight of coal carbonized per retort per 24 hours is 22 cwt. 41 lbs. with steam, and 23 cwt. 77 lbs. without steam."

It will be seen from these comparisons that about double the volume of gas is obtained, and double the weight of coal is carbonized, per retort with the Glover-West system of continuous carbonization on approximately the same ground area.

As many of you will be desirous of knowing something about the very important question of wear and tear of the retorts, it may be stated with confidence that, after a recent careful inspection, and from the experience gained during the thirteen months' working of these retorts, we are satisfied that they will compare more than favourably with the other systems, taking into consideration the amount of work done. As to the mechanism for working the gear in connection with these retorts, you no doubt have observed that it is of a strong and substantial character, and that the wear and tear on it is very little indeed, owing to the slow-moving action of the whole of the parts; and it is satisfactory to note that since the plant was started it has not cost anything for repairs.



Sections of the Glover-West Vertical Retort-Setting.



The Coke Chambers and Discharging Doors.

We may say, from the experience gained in working these retorts, that it is not advisable to admit any steam with the view of making water gas in the same retorts; and we have concluded that, should it be thought desirable to add water gas, it would be more economical to make it in a separate apparatus.

The author desires to express his hearty appreciation of the help he has received in carrying out the introduction of vertical retorts at the St. Helens works, and in conducting the initial experimental work, from having an enterprising and thoroughly businesslike

Committee, a willing and efficient staff of workmen and officials, and a firm of Contractors of the ability and experience of West's Gas Improvement Company.

Discussion.

The PRESIDENT said that, without going into the whole question of vertical retorts, he might remark that the name of West had long been honoured as one holding a foremost position in the gas industry. It was now nearly thirty years since he had the pleasure of first operating the West machinery; and he had some now at Sheffield which he should be sorry to put on the scrap heap. That day they had seen the results of the labour of Mr. West and Mr. Glover. It was not by any means an experimental plant, but sufficient to produce gas for many a small town; and they had been given results second to none. What struck him most was the easy and silent way the work was done in the retort-house; and they must not forget that it would reduce labour. It did away with the hard and laborious work that men had to do in front of the retorts. He thought it would not be long before they saw a great extension of the system.

Mr. J. G. NEWBIGGING (Manchester), as one who would have the honour of putting in the second installation of Glover-West retorts, would be expected to say something in regard to them. For some two or three years, they at Manchester had been contemplating the extension of their carbonizing plant; and in considering this matter, it was necessary to give attention to the different methods. Whatever installation they put in would have something to compete against in their horizontal retorts charged and drawn with West's compressed-air machinery. They carbonized from 8 to 8½ cwt. of coal per 20-feet retort, with six-hour charges, and produced from 9000 to 10,000 cubic feet of gas per mouthpiece per 24 hours; the candle-feet working out at 200,000 and upwards per ton of coal (only) carbonized—11,200 cubic feet × 18 candles ("Metropolitan" argand burner No. 2) = 201,600 candle-feet. Finally they decided to have the Glover-West vertical retorts; and the work had just been started. They were struck with the simple way in which the coal was carbonized and the excellent results which had been obtained on the unimpeachable authority of Dr. Harold Colman. It was these facts that had induced them at Manchester to give the Glover-West system a trial; and they had decided to put up an installation of very much greater size than the one the members had just seen. They fully believed it would be a success.

Mr. J. C. BELTON (Chester) said the comparisons set out in the handsome souvenir presented to them by Messrs. Glover and West were doubly interesting, as showing the different results obtained from the same coal when carbonized in verticals and in horizontals with West's manual machinery, with which many of them had practical acquaintance. Having used these machines for about 15 years, he could safely say that he believed they were the best that could be used where power machinery was not available, judging by carbonizing results; and the plant that could beat them must be good. Therefore, to set out on a series of comparisons of the working of verticals and horizontals with West's machinery meant subjecting the new departure at its very inception to a test so stringent and severe that the designers might well feel some apprehension as to how their unweaned infant would come out of the ordeal. But those of them who had to do with Mr. John West knew something of the indomitable spirit which characterized his method of handling any difficult problems, and the absolute thoroughness of his mastery of details; and when they heard that Mr. West had joined Mr. Glover in this enterprise, they felt assured that, come failure or come success, they should presently arrive at a reliable conclusion with regard to the much-debated claims of the vertical retort. He had to congratulate Mr. Glover and Mr. West upon the highly satisfactory results they had achieved throughout a long series of experimental and test operations, all of which had been carried out with such great care and minuteness, and the results watched, recorded, and certified by experts of such eminence and authority that they might be unhesitatingly accepted as absolutely reliable. Another result of the trials recorded in the souvenir was that future installations of these verticals would have the advantage of the experience now being gained at St. Helens by the correction of errors and by the adjustment of methods to requirements, which was the fruit of all experimental work. The system of regeneration by the absorption of heat from the coke near the bottom of the retort, could, of course, only be applied to verticals; but it possessed obvious advantages over the prevailing practice. The cleanness and quietness of the process, the great reduction—in fact, the absence—of arduous manual labour and the simplification of machinery for operating the plant, were advantages of solid value, which would appeal to all gas engineers. The improvement of the coke and tar, and the absence of all trouble with stopped pipes and pitched hydraulics, were further attractive features of this system of carbonization, the full value of which could only be appreciated when a large installation was got to work. Mr. Glover had been good enough to give in the souvenir results obtained from two kinds of cheap slack carbonized in the verticals; and these results were very fair. He (Mr. Belton) noticed from the book that the average yield of the several kinds of cheap coals carbonized in the horizontal retorts with West's machinery was about 10,000 cubic feet per ton. This, however, did not give a comparison so accurate as the other tests; and he thought it would be very useful if Mr. Glover would tell them what was the average price paid for these cheap coals.

Mr. GLOVER: It depends upon the market price.

Mr. BELTON (continuing) said perhaps Mr. Glover would tell them what he obtained in the horizontal retorts from the two kinds of cheap slack with which the verticals were supplied for this particular test. In conclusion, he (Mr. Belton) said they had seen that day a new system of carbonization which has proved to have a producing capacity some 60 per cent. greater than any existing system, which could be worked on the same ground space; and in view of this one solid fact alone, they must agree there was a great future before them in the system of carbonization by vertical retorts.

Mr. J. W. HELPS (Croydon) said he was extremely glad earlier in the day to hear Mr. Newbigging refer to the work done by Messrs. Woodall and Duckham in the class of retorts they had seen in operation that morning, and producing such excellent results. For after all they ought to give credit to the men who had done work before on this system. Then he thought they must acknowledge that the main principles of the two systems were the same. Messrs. Woodall and Duckham had followed out their work under great difficulties; and he thought it only fair they should be given credit for what they had done in this field of labour. (Hear, hear.) Messrs. Glover and West had succeeded in working on a small ground space, which was a very important point. Though they had obtained from the Glover-West retorts such excellent results, he would not advise his friends to scrap their horizontal retorts to put in verticals, because there were sure to be great improvements in the near future in horizontal retorts. Messrs. Glover and West had, in his opinion, been very wise in calling in such an eminent authority and honest expert as Dr. Colman.

Mr. THOMAS NEWBIGGING (Manchester) said they had confidence that Messrs. Glover and West had settled the question with regard to retorts.

It was suggested at this stage that, as time was getting on, the discussion on the subject be adjourned to the next meeting; and this was agreed to.

Mr. JOHN WEST (Manchester), in the course of a few remarks, said that by the next meeting they would have something more to show them.

Mr. GLOVER said that, as the full discussion on the subject had been postponed, he would reserve his reply. He might, however, answer Mr. Belton's question by saying the figures were 10,250 and 10,300. As to what Mr. Helps had said, he, while not behind anyone in praise of what Messrs. Woodall and Duckham had achieved, disclaimed having got the least inspiration or the slightest idea or guidance from anything that they had done. Messrs. Woodall and Duckham went their way, and he went his own. He had had some guidance from his very old friend Mr. Young, who had been working on this subject for ten years before he heard of anyone else taking up the question of vertical retorts. With this knowledge, and the assistance of Mr. West, he had been able to produce what they had seen that day—thus removing a rebuke that had rested on the gas industry such a long time.

Mr. WEST said he also wished to give credit to Messrs. Woodall and Duckham for what they had done; but at the same time he desired to say that he had never seen any of their retorts, either in or out of their works.

A vote of thanks to the Mayor and Corporation of St. Helens for the use of the Town Hall concluded the business meeting.

Afterwards the members had tea with Mr. Glover in the reception-room of the same building; this bringing to a close the proceedings of the day.

Mr. E. A. Hedley, of Windsor Crescent, Newcastle-upon-Tyne, the Deputy-Chairman of the Newcastle-upon-Tyne and Gateshead Gas Company, who died on the 12th of September, aged 83, left estate of the gross value of £23,355, with net personalty £20,804.

The fourth annual meeting of the American Gas Institute was opened in Detroit (Mich.), on the 20th ult., under the presidency of Mr. Charles F. Pritchard. There were upwards of 300 members present. The first day's proceedings consisted largely of the President's Address and the presentation of reports of Committees; but some papers were read, and the remainder were disposed of next day. These will be noticed in subsequent issues of the "JOURNAL." The new President is Mr. W. H. Bradley, of New York.

To determine concrete proportions for greatest density, Mr. Albert Moyer suggests experiments with a receptacle holding 4 cubic feet, as, for example, a 15-inch sewer-pipe. By using two or three sizes of crushed stone properly proportioned, a denser concrete may be obtained, and cement and sand saved. If there are two sizes of stone, one passing a 1½-inch and the other a ¾-inch ring, the latter should be screened to remove all that will pass a ¼-inch screen, regarding this as sand. Then 2 cubic feet of the smaller and a like quantity of the larger stone are well mixed and put into the pipe, and the top of the mixture marked on the side. A mixture of 2½ cubic feet of the larger stone and 1½ cubic feet of the smaller stone, and a number of other proportions, are then tried, and the one giving the least volume will give the densest and strongest concrete with the least sand and cement.

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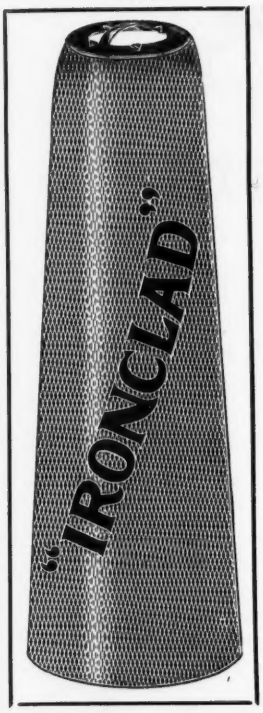

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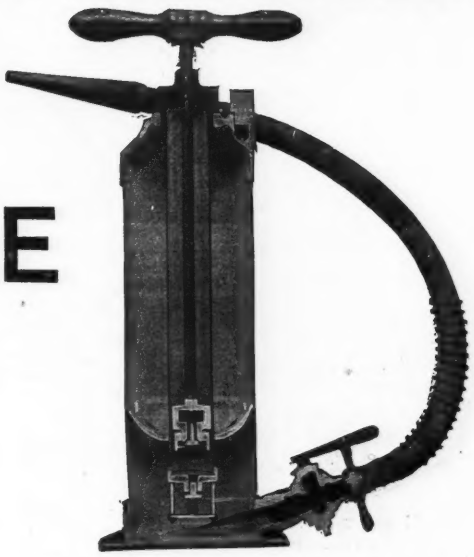

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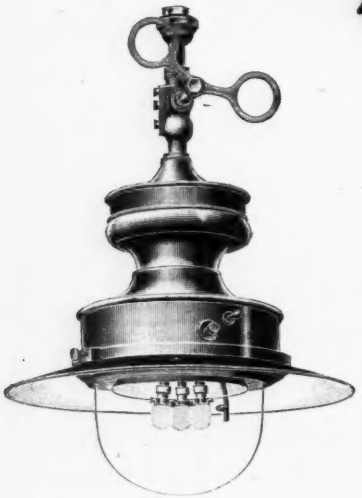

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FLICKER PHOTOMETRY AND THE EYE.

Some interesting points in connection with flicker photometry are discussed by Mr. J. S. Dow in a recent contribution to the "Illuminating Engineer." In view of the apparent fact that the tungsten lamp gives lower candle power results when tested by the flicker than when tested by the ordinary photometer, the question is raised whether the appreciable differences possible in readings obtained by the latter instrument may not, to some extent, occur in the use of the former. If this be not the case, the varying readings of the ordinary photometer due to the retinal peculiarities must sometimes lead to conclusions differing from those indicated by the flicker instrument. In any such comparison of results, Mr. Dow rightly suggests the need of a deeper knowledge of the physiological basis of the flicker photometer, and more particularly as to the action of the retinal rods and cones. For a short explanation of the rod-and-cone theory, readers may be referred to the "Journal" for Sept. 10, 1907 (p. 686). Mr. Dow's experiments are in accord with those of others in indicating that the flicker photometer is less subject to the Parkinje and yellow-spot effects than are photometers which utilize the principle of equality of brightness; and the supposition follows that the struggle for predominance on the part of the rods and cones of the retina is in some way lessened when the first-named instrument is used.

Mr. Wild, in the "Electrician," had previously suggested that the reading of the flicker photometer might depend only on the action of the rods. Mr. Dow, however, does not agree with this, since the instrument can be effectively used at somewhat high illuminations when the cones are believed to be predominant; and he offers an explanation on different lines. Granted that the cones and rods exercise distinct functions, the sum effect in the flicker apparatus can be imagined to consist of flickers due both to cone and rod actions taking place simultaneously. With either set of organs inoperative, there would be only rod flicker or cone flicker respectively. Thus at very low illuminations with the cones out of action and the central part of the retina practically blind, there would be rod flicker alone, which could only be perceived by bringing the peripheral region of the retina into play by looking at the flicker obliquely.

It is believed that, in addition to their distinct action from the cones as regards perception of light and colour, the rods also differ in the duration of the luminous impression received. It seems possible that an impression received only through the rods remains active for a longer period than one obtained through the cones, and that therefore a flicker speed satisfactory for cone flicker might be high enough to blend the impression received through the rods. A flicker due to cone action would thus be obtained, and superimposed over this a steady luminous impression resulting from impulses received through the rods, which succeed each other too rapidly to give rise to any flicker sensation. Mr. Dow suggests that this would account for the apparent fact that the retinal colour effects due to the struggle between the rods and cones are so much less marked in the case of the flicker photometer, for it might well be that, under the normal conditions of use, the speed was too high for the rods to materially affect its readings. It also seems to accord with the fact that the "critical speed" of the flicker instrument is known to increase with increasing illumination.

Reference is made to the fact that when a coloured object is rotated before the eye, under certain conditions, a "recurrent image" is visible; and evidence suggests that the latter is perceived through the rods, while the main image is connected with the cones. Mr. Dow adds, as further corroboration, that the quality of flicker of a very low illumination is of a peculiar violent character, and quite different from the fine trembling sensation noticeable at high illuminations. He is inclined to think that the violent quality is associated with the action of the rods, and the fine trembling variety with the cones. In support of this, it is pointed out that the former is most readily observable at slow speeds and low illuminations; and, too, by indirect vision—vanishing when one looks straight at the object. The finer flicker is best perceived by using the central portion of the retina.

On the theory thus advanced, Mr. Dow says it might be expected that photometers of both the flicker and equality of brightness types would give results agreeing very well with each other at high illuminations when the cones are the predominant organs; but some differences are to be anticipated at lower illuminations, when the struggle between the rods and cones is in progress. The readings, however, of both instruments must probably be considered to some extent as arbitrary when different coloured sources of light are concerned.

The article concludes with the suggestion that further data are required; and as the basis of the problem is essentially physiological, the help of both physicists and physiologists, working in co-operation, is desirable.

Society of British Gas Industries.—The autumn meeting of the Society will be held at the Waldorf Hotel, Aldwych, on the 23rd inst., under the presidency of Mr. Thomas Newbigging, M.Inst.C.E. The proceedings will include an address by Mr. C. E. Brackenbury, Barrister-at-Law, on "Some Legal Aspects of the Smoke Nuisance." At the close of the meeting the members will dine together.

WATER LEGISLATION FOR 1909.

In preceding issues of the "Journal," the principal features of the Gas Acts of the present session have been noticed. We now deal with the measures relating to water supply; taking first those applying to Companies.

By the Act of the Aldershot Gas, Water, and District Lighting Company, authority is given for the construction of a well and pumping-station, a pipe-line connecting it with the reservoir station at Cargate Hill, a covered service reservoir there, and a second pumping-station. Subject to the provisions of the Act, the Company may take the water from any springs and streams that may be intercepted by these works. They are not, however, to abstract water from the River Thames, or any tributary thereof, or from any defined surface channel discharging into the river, without the consent in writing of the Conservators. The capital is to be consolidated and converted; and authority is given for the raising of an additional £200,000 of "C" stock, including premiums. The other portions of the Act have already been dealt with. [*Parliamentary Agents: Messrs. Blyth, Dutton, Hartley, and Blyth.*]

The Bungay Water Act incorporates the Bungay Water Company, and authorizes them to supply water in the parishes of Holy Trinity and St. Mary, Bungay, the borough of Eye, and the parish of Mendham, in the county of Suffolk, and the parishes of Ditchingham and Redenhall-with-Harleston, in the county of Norfolk. The capital of the Company is £25,000, in £10 shares; and borrowing powers to the amount of one-third are granted. The Company are authorized to make and maintain a well and pumping-station at Bungay, another at Eye, and a third at Redenhall, together with a reservoir, two water-towers, and several conduits or pipe-lines, and other ancillary works, for the completion of which five years are allowed. The charge for water for domestic purposes is to be based upon the rateable value of the premises supplied, with a minimum of 8s. 8d. per annum, and extras for a second closet and every fixed bath. Where the supply is by measure, 1s. 6d. per 1000 gallons is to be the maximum charge; but the Company are, on demand, to afford the Corporation of Eye a reasonable supply of water for sanitary purposes at a price not exceeding 1s. per 1000 gallons. Authority is given for the sale of water in bulk, and for making bye-laws for the prevention of waste, undue consumption, or contamination of the water. [*Parliamentary Agents: Messrs. Baker and Co.*]

The Clevedon Water Act incorporates and confers powers upon the Clevedon Water Company; the present Company being dissolved. The limits of supply are to be the urban district of Clevedon and the parishes of Tickenham and Kenn, and part of the parish of Walton-in-Gordano, in the rural district of Long Ashton, in the county of Somerset. The capital is to be £55,000, of which £40,000 is to be original, and to be entitled to maximum dividends of 7 per cent. per annum in respect of £29,000 ordinary and 4½ per cent. in respect of £11,000 preference, and the remainder additional capital, which is to be sold by auction or tender. The dividends are not to exceed the above-named rates. Power is granted to borrow to the extent of one-third of the capital raised, as well as to issue debenture stock. Authority is given to maintain and renew the existing works, consisting of two wells, pumping-stations, and reservoirs in the parish and urban district of Clevedon, and two aqueducts, conduits, or pipe-lines connecting them. The charges for water are based on the gross estimated rental of the premises supplied, and are 8s. 8d. per annum where this is under £5, and 8½ per cent. where it is above this figure, with the usual additions for an extra closet and a fixed bath. The charge for water supplied by meter is not to exceed 1s. 6d. per 1000 gallons; but water required for public purposes is not to cost more than 9d. per 1000 gallons. The Company seek power to sell water in bulk, supply fittings, &c. [*Parliamentary Agents: Messrs. Sherwood and Co.*]

The Donington Water Act incorporates the Donington Water Company, and enables them to supply water in that parish and others in the county of Lincoln. The capital is to be £12,000, in £10 shares; and the usual borrowing powers are granted. It is intended to construct a well and pumping-station at Donington, a water-tower on the road leading therefrom to Horbling, and a line of pipes connecting them—all to be completed within two years. The charge for water for domestic purposes is based on the rateable value of the premises, with the usual minimum of 8s. 8d. per annum, and extras for a second closet and every fixed bath. For supplies by meter, the maximum price is to be 1s. 6d. per 1000 gallons. The Company are authorized to sell water in bulk, supply materials, make bye-laws for preventing waste, &c. [*Parliamentary Agents: Messrs. Baker and Co.*]

The Frimley and Farnborough District Water Act extends the limits of supply of the Company so as to include a number of parishes and places in the rural districts of Basingstoke and Hartley Wintney, but in the case of the latter place only with the consent in writing of the Rural District Council, who are to have the same right of supplying water from works of their own to any part of the parish not served as they would have had if the Act had not passed. Provision is made for the use by the Company of lands at Sturt Lane Junction for the purposes of their undertaking, and for the maintenance and extension of the pumping-station and other works already constructed by them thereon. The expenditure of capital on these works, as well as on those at Blackhill, in the parish and urban district of Windlesham,

in Surrey, is sanctioned and confirmed. Authority is given for carrying out new works, comprising a well (already partially sunk) and pumping-station in the parish of Odiham, a service reservoir in the parish of South Warnborough, and two pipe-lines. The well and one of the pipe-lines are to be completed, and the reservoir made capable of holding 500,000 gallons, within five years after the passing of the Act; the reservoir and the other pipe-line to be completed within ten years. The Company are given authority to raise additional capital to an amount not exceeding £70,000 by auction or tender; and the limits of dividend upon it are 7 or 5 per cent. per annum, according as it is issued as ordinary or preference. Power to borrow one-fourth of the amount is granted, and also to create debenture stock. [*Parliamentary Agents: Messrs. Sherwood and Co.*]

The Grantham Water Act confers further powers upon the Grantham Water Company. Authority is given to construct additional works, comprising a dam or weir, with a catchpit or intake and other works in connection therewith, across the Cringle Brook, a reservoir upon the River Witham and adjacent lands, a diversion of the river, and an aqueduct or pipe-line; and a period of ten years is allowed for their completion. Confirmation is given for the construction of a sedimentation reservoir in the parish of Little Ponton, on the east side of the River Witham. The Company are empowered to appropriate the waters of the Cringle Brook by means of the dam already referred to. As from the 1st of January next, the shares are to be converted into 5 per cent. stock, at the rate of £20 of stock for each existing share; and sufficient additional capital may be raised by auction or tender to produce, with premiums, £40,000. Authority is given to raise by loan any sum or sums not exceeding, with the £7200 already borrowed, one-third of the nominal amount of the consolidated ordinary stock issued in exchange for the existing shares; and also up to one-third of the additional capital. Other powers conferred by the Act relate to the supply of fittings, the sale of water in bulk, and the erection of cottages for the officers and servants. [*Parliamentary Agents: Messrs. Rees and Freres.*]

The Pontypool Gas and Water Act is principally to empower the Company to construct additional water-works and raise further capital. The works authorized comprise an intake weir, a reservoir, and a catchwater in the parish of Panteg, a number of pipe-lines and drifts, and a well and pumping-station in the parish of Blaenavon. For some portions of these, however, and for others which have been constructed, confirmation was sought in the Bill, and it has been granted. The reservoir referred to is to be so far completed within five years as to be capable of holding not less than 10 million gallons of water; likewise two lines of pipes and the intake weir; and all the works sanctioned are to be finished within fifteen years. The waters of several springs and streams are to be appropriated; and the Company are authorized to enter into, vary, or rescind agreements with Westlake's Brewery Company, Limited, for the purchase of their surplus water at Cwmavon. As from Aug. 1, 1914, section 55 of the Company's Act of 1873 is repealed, and for it is substituted a provision to the effect that the water need not be constantly laid on under pressure, but be supplied at such pressure as will be afforded by gravitation from the respective reservoirs or tanks from which it is being drawn. The other water clauses of the Act relate to the making of bye-laws for preventing pollution and waste, and give power to the Company to hold lands for the protection of their works, sell water in bulk, sell or let meters, and supply fittings. The Company may raise for the purposes of their water undertaking £65,000 (the maximum dividend on which is to be 7 per cent.), with borrowing powers to the extent of one-third. The clauses of the Act relating to gas have already been noticed. [*Parliamentary Agents: Messrs. Rees and Freres.*]

The Pontypridd Water Act empowers the Pontypridd Water Company to construct railways and other works in the counties of Brecon and Glamorgan, and to abandon certain works authorized by their Act of last session. The new works consist of four railways, a service reservoir, two aqueducts, a road widening, and an approach road; and they are to be completed within three years. It is intended to abandon the construction of the Lan Wood reservoir and the connecting lines of pipes, which are rendered unnecessary by the service reservoir now sanctioned, and also the tramroad authorized by the Act already referred to; and compensation is to be made for any damage done in respect of these works. The Company may use their existing capital powers for the purposes of the Act. Certain specified portions of the Act of 1908 are to be amended and repealed. [*Parliamentary Agents: Messrs. W. & W. M. Bell.*]

The South Lincolnshire Water Company are authorized by their Act to extend their limits of supply so as to include the parish of Pinchbeck, in the county of Lincoln, and construct additional works, comprising a well and pumping-station in the above-named parish, and a conduit or pipe-line therefrom to the parish of Weston, to be completed within two years. An agreement entered into on March 22, 1909, between Mr. J. E. Aldersley and the Company, for the purchase by the latter of the undertaking of the Fen Water Company, is confirmed. The Company may apply their funds for the purposes of the Act. [*Parliamentary Agents: Messrs. Baker and Co.*]

The Act of the South Staffordshire Water Company authorizes the construction of additional works, sanctions and confirms existing works, and empowers the Company to increase their capital. The new works consist of a pumping-station in the parish of Burntwood Edial and Woodhouses, in the county of Stafford, and a pipe-line running from it to a point near the Company's Scout House reservoir at Cannock. The works already constructed, for which the Company have obtained parliamentary sanction, consist of eleven pumping-stations and four reservoirs. Seven years are allowed for the completion of the new works. Authority is given for raising additional capital to an amount not exceeding £60,000, by the issue of either ordinary or preference stock, to be entitled to 7 or 5 per cent. dividend according to the nature of the stock; and the Company may borrow to the amount of one-third, and also create debenture stock—the dividend in both cases being limited to 4 per cent. per annum. In the Bill, the Company asked for £300,000 of new capital, with borrowing powers to the extent of one-fourth. The Act contains a large number of provisions for the protection of various parties, including the Seisdon Rural District Council and the owners and occupiers in part of their district in which are situated the Company's Ashwood and Hinksford pumping-stations. On and after June 30, 1912, the rates for the supply of water for domestic purposes in Burton-on-Trent are to be the same as those charged in other parts of the Company's limits. [*Parliamentary Agents: Messrs. Sherwood and Co.*]

By the Act obtained by the West Gloucestershire Water Company, further powers are conferred upon them in respect of their undertaking. The Act extends their limits of supply to the several parishes and places specified, where the charges are not to exceed those paid for a supply of water under similar conditions by consumers in the original area. Additional capital to the amount of £90,000 is sanctioned, to be issued either as ordinary or preference, and to be entitled to 7 or 5 per cent. dividend. Borrowing powers to the extent of one-third of the new capital, as well as for the creation of debenture stock, are granted. Sanction is given to hold certain lands at Oldland and Bitton, in the rural district of Warmley; and also at Cowhorn Hill, on lease. A section in the Act specifies that the Company and the Bristol Gas Company are to give each other notice before commencing to dig any trench for the laying of mains. [*Parliamentary Agents: Messrs. Sherwood and Co.*]

The Worksop Water Act authorizes the Worksop Water Company to raise more capital; and it sanctions and confirms certain works already existing. By the Bill, it was proposed to make a well or wells and erect a pumping-station at Checker House, in the parish and urban district of Worksop; but these works were abandoned. The works for which sanction has been obtained are a well or wells adjoining the existing pumping-station at Sunnyside. Additional capital is authorized to the amount of £24,000, to carry 7 per cent. maximum dividend if issued as ordinary, and 5 per cent. if as preference capital. Borrowing powers to an amount not exceeding one-third of the issued capital are granted; and the Company may create debenture stock. The interest on the money raised by these means is to be limited to 5 per cent., unless the Board of Trade sanction the payment of a higher rate. The Company are to supply the Blyth and Cuckney Rural District Council with such daily quantity of water in bulk, at a price not exceeding 7d. per 1000 gallons, as the Council shall require and may agree to take. [*Parliamentary Agents: Messrs. Sherwood and Co.*]

Mansfield's Oil-Gas Apparatus.

The lighting of small villages and towns, country mansions, isolated houses, and places out of reach of ordinary gas-works, is a problem which has frequently presented itself; but of late years it has been to a large extent solved by the introduction of acetylene, electricity, and oil gas. Among others who have assisted in overcoming the difficulty are Messrs. Mansfield and Sons, Limited, of Liverpool, who have produced a simple, compact plant which makes gas from any kind of mineral, animal, or vegetable oil for any commercial, domestic, or industrial purpose where light, power, or heat is required. The apparatus is described and illustrated in a neat booklet which the firm have just issued, wherein will be found particulars as to the places for the lighting of which the gas is specially suitable, and a few figures in regard to its illuminating quality and cost. The apparatus, which is easily erected and can be worked by any unskilled labourer, has been in successful operation for upwards of forty years in all parts of the world. It may therefore be safely commended to the notice of those who have under consideration the lighting of localities such as those mentioned at the outset.

Cost of Water Heating by Electricity.—It is stated that hot water is to be supplied to the lavatories in the Marylebone Town Hall by means of small Therol electrical heaters. The cost of supplying and fixing the apparatus will be £45; and the annual cost for energy, which will be supplied at 1d. per unit, is estimated at about £10.

Southern District Association of Gas Engineers and Managers.—The *agenda* for the meeting of the Association which will take place on Thursday of this week at the Hotel Cecil includes two motions for alterations of the rules as affecting the Committee, and three papers. The latter are as follows: "Some Notes and Experiences on Gas Lighting," by Mr. H. N. Clark; "Capital—an Aftermath," by Mr. D. T. Livesey; and "High Temperature Carbonization—Its Difficulties and their Cure," by Mr. W. B. Randall. At the conclusion of the business, the members will sit down to "high tea."

COSTS OF A GAS-ENGINE AND OF A COMBINED STEAM PLANT.

By T. M. Chance, of Philadelphia, in "Engineering Record."

In the many excellent articles upon the relative financial economy of steam and gas driven stations which have appeared in the Technical Press during the last few years, the issues have been variously discussed, and reliable data furnished, from which somewhat definite conclusions may be drawn as to which of the two is preferable for any particular service. At or near full load, the gas-engine has so far shown a decided economic superiority, and even in the lower ranges of load-factor is an important rival of the engine or turbine-driven steam-plant. But the first cost of a gas-engine (with its producer, scrubbers, and auxiliaries) is high; and where cheap anthracite or coke cannot be had, the operation of the producer on soft coal requires more intelligent attendance and skill than the steam-boiler. If a plant can be installed that will have the small first cost and low fixed charges of the steam plant, and at the same time approach the gas-engine in low operating costs, without, however, the necessity of a troublesome bituminous producer, it will go far toward a satisfactory solution of the power problem. In the past two years, such a solution has been found in the adoption of the low-pressure turbine, utilizing the exhaust of high-economy Corliss steam-engines.

For the purpose of comparing the economy of this type of power plant with that of the gas-engine, the total cost of operating and maintaining, under like conditions, a 1000-kw. plant of each type will be considered. It must be borne in mind, however, that the conclusions so reached apply with even greater force to larger-sized stations, as the first cost per kilowatt of the combined steam plant decreases more rapidly as the power per unit increases than does that of the gas plant. We will assume the locality to be one in which good steam coal can be bought for $1 to $4 a ton, condensing water to be plentiful and at a fair mean temperature, and labour to be average in price. Both plants are to run 24 hours a day, 365 days in the year; and are to carry at least 20 per cent. load-factor. Each plant will be assumed to have a reserve unit of one-half the total capacity of the plant. It will be understood that the term "load-factor" will here be used to mean the fraction "(100 per cent. × total kilowatt per 24 hours) ÷ rated kilowatt," assuming continuous operation of the plant throughout the 24 hours. Under these conditions, a low load-factor denotes a high fuel consumption.

The gas-driven plant requires three tandem four-cycle double-acting 500-kw. units, with generators, producers, and auxiliaries. In the case of the steam plant, we can assume the exhaust turbine to be capable of delivering 80 per cent. of the rating of the non-condensing engine serving it. Hence, a 550-kw. compound Corliss engine and generator delivering all of its exhaust steam to a low-pressure turbo-generator of 450-kw. capacity meets the requirements of 1000-kw. output. The turbine may be a balanced double-flow reaction machine or, as the exhaust areas are comparatively small for this sized unit, it may be built single-flow and fitted with balancing pistons. The mixed-flow impulse type, being provided with high-pressure nozzles for admitting boiler steam when overloaded, is also well fitted for this class of work. The turbine may serve a separate circuit, in which case a governor and live steam connection with the boiler are required; or it may run in electrical unison with the engine, obviating the necessity for independent governing mechanism. At times of low load the engine can be connected directly to the condenser, and the turbine cut out if both engine and turbine are on the same circuit, or if the circuit that the turbine serves does not require current at such times. A reserve duplicate Corliss unit is an ample safeguard against shut-downs, as in case of injury to the turbine the two engine units can carry the load, or, if either engine is out of commission, of course, the other may be run in conjunction with the turbine.

The producer equipment of the gas plant will consist of three individual units, fitted with suitable scrubbers, superheaters, tar-extractors, and such auxiliaries, and may be either of the up or down draught type. No attempt has been made to consider a bye-product recovery plant of the Mond type, as the total amount of coal burned at full load would be less than 21 tons per day—a tonnage entirely too small for economical operation by the Mond system.

The maximum boiler capacity of the steam plant will be that required when the turbine and condenser are shut down and both engines operated non-condensing. Assuming a maximum water rate of 29 lbs. per kw.-hour under these conditions, the plant output of 1000 kw. will require 29,000 lbs. of steam per hour, or 900 boiler-horse-power. As maximum economy is not a necessity when the plant is run by the engines only, three 225-H.P. units, driven one-third above rating, will supply the required amount of steam. Hence, allowing one stand-by unit, the boiler equipment of the steam plant may consist of four 225-H.P. horizontal front-fired water-tube units, with economizers, stokers, internal superheaters, feed pumps, and the usual equipment. The advisability of superheat in a plant of this size may be questioned; but as it serves to deliver dry steam to the turbine, and obviates the necessity of steam separators in the exhaust line of the engines, its use is perfectly rational, and the efficiency of the plant will be improved by its employment. A centrifugal jet condenser with rotative dry-air pump or a barometric tube may be employed to produce the necessary turbine vacuum of 28 inches; either of these types of condenser being efficient and moderate in price.

The two Corliss compound engines, three-phase generators, exciters, switchboard, steam-boilers, and auxiliaries will cost about $88,000, or $80 per kilowatt. The turbo-generator, with its condenser and auxiliaries, will cost about $22,500, or $50 per kilowatt, making the total cost of the steam plant machinery $110,500. The cost of the three four-cycle gas-engines with three-phase generators, exciters, switchboard, air-starting apparatus, and gas generating plant will amount to about $142,500, or $95 per kilowatt. The cost of buildings or foundations is not included in either of these estimates.

A day engineer at $4, and a night engineer at $3, with two helpers at $2 and two firemen at $2, are required for either plant, making the total labour expense for the 24 hours $15. Oil, waste, and supplies have been charged at $5 in each plant.

In Table I. interest has been computed at 5 per cent., and depreciation, maintenance, and repairs charged to both plants at the rate of 10 per cent. This 10 per cent. charge includes an 11 per cent. charge for depreciation, maintenance, and repairs of the engines and boiler plant, and a 6 per cent. charge for depreciation, maintenance, and repairs of turbine; the latter charge being relatively smaller because no boiler costs are entailed by its use, except when the live steam connection is employed in cases of emergency or severe overload.

It will be seen from Table I. that there is a constant hourly charge of $2·725 against the steam plant and of $3·273 against the gas plant, whether the load-factor be high or low. This constant cost may be designated as the "plant charge," to differentiate it from the various items of fixed charges and from the total power cost. At low loads there would be a slight decrease in the cost of waste, lubricants, and such supplies, and consequently in the "plant charge;" but as this would affect each plant equally, it has not been considered.

Table I.—*Costs and Interest of Steam and Gas Plants.*

	Steam Plant.	Gas Plant.
Two 550-kw. engine units with generators, boilers, and all steam and electric auxiliaries . . .	$88,000·00	—
One 450-kw. exhaust turbine with generator, condenser, and other auxiliaries	22,500·00	—
Three 500-kw. engine units with generator, producers, and all gas and electric auxiliaries . . .	—	$142,500·00
Total cost of plant . . .	$110,500·00	$142,500·00
Interest at 5 per cent.	5,525·00	7,125·00
Depreciation, maintenance, and repairs at 10 per cent.	11,050·00	14,250·00
Attendance of plant at $15 per 24-hour day for year of 365 days .	5,475·00	5,475·00
Oil, waste, &c., at $5 per 24-hour day for year of 365 days . . .	1,825·00	1,825·00
Yearly cost, exclusive of fuel	$23,875·00	$28,675·00
"Plant charge"—*i.e.*, hourly cost, exclusive of fuel.	$2·725	$3·273

To determine the relative cost of fuel per kw.-hour the two curves in fig. 1 have been plotted, showing the coal consumption, including stand-by losses, of the two plants at different loads.

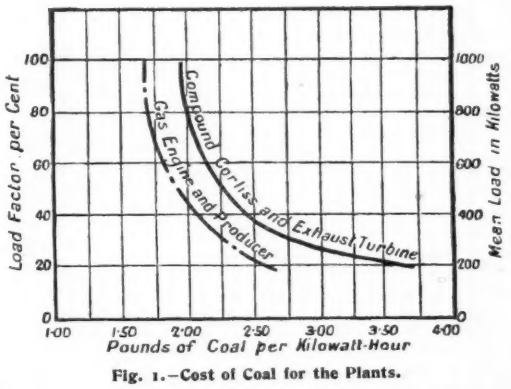


Fig. 1.—Cost of Coal for the Plants.

The curve of coal consumption for the steam plant is based upon an actual evaporation in service of 8 lbs. of water per pound of coal burned, and on an assumption of 165 lbs. initial pressure expanding to 17 lbs. in the engine and to 28-inch vacuum in the turbine, allowing 1-lb. pressure-drop between the engine and the turbine, as recommended by Mr. J. R. Bibbins, in his paper before the Canadian Society of Civil Engineers, Nov. 26, 1908. An engine working through such a pressure range may be expected to give good economy, and the allowance of 1-lb. drop between engine and turbine obviates the injurious effects upon the engine of a variable back-pressure due to the turbine. In plotting the

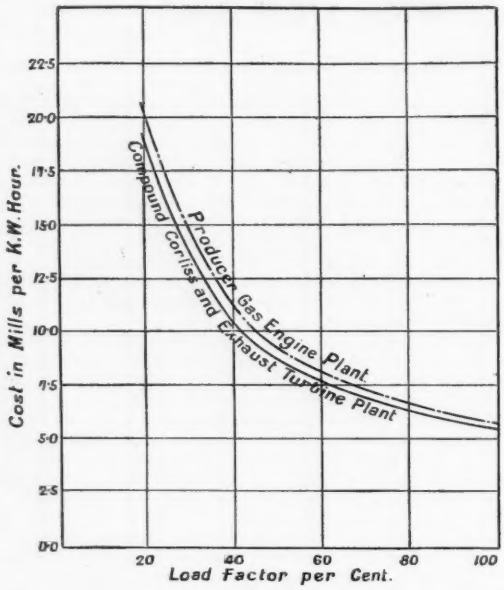


Fig. 2.—Increase in Cost with Different Load Factors.

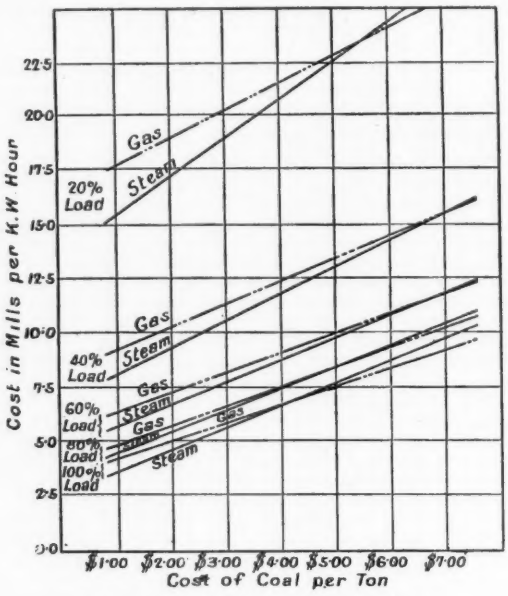


Fig. 3.—Effect of Cost of Coal on Power Cost.

curve of coal consumption for the gas plant, it has been assumed that the load carried is of a violently varying nature, with severe peaks, such as are met with in electric railway work or in rolling mills. Hence two units must be kept in use for the greater part of the time. Where the low load-factor is caused by a steady light load, with a heavy peak of short duration, the coal consumption shown by this curve can be decreased by running one unit only when the load falls off. In large stations, with a number of individual units, light loads would not cause the great increase in fuel per kw.-hour indicated by these curves, as the load could be divided between a few machines, and these driven at full load; so that the loss in economy would be small—being principally due to the banking of the extra boilers or producers.

The cost per kw.-hour (exclusive of the fuel charge) may be determined for any particular load-factor by dividing the plant charges, $2·725 and $3·273, by the load carried in kilowatts. This quotient of plant charge divided by the load, added to the cost of coal per kw.-hour at the load-factor investigated, gives the total expense of generating one kw.-hour; and a curve may be drawn showing the relation of this total cost to the load-factor. In fig. 2 curves have been plotted for the two plants, showing the increase of cost per kw.-hour with loads ranging from 1000 to 200 kw. The pounds of coal per kw.-hour used in determining the fuel cost at various loads are those shown by the curves in fig. 1. Coal is assumed to be worth $3 per ton of 2000 lbs.; plant charges to be $2·725 and $3·273 an hour. A glance at these two curves shows that, with $3 worth of coal, the steam plant is the more economical at every stage of load above and including 200 kw., the lowest load considered, and that the difference in cost per kw.-hour increases as the load-factor dealt with grows smaller.

The curves of fig. 3 illustrate the effect of the price of coal on the cost per kw.-hour; the load-factor being assumed to be constant for each pair of curves drawn. These curves are all straight lines; and they show that the greatest difference in cost exists at the lowest price of coal—the steam-plant curve approaching that of the gas-plant as this price increases. At the coal cost per ton corresponding to the intersection of these curves, both stations are of equal economy. At any price of coal greater than this "critical" price, the gas plant is the more economical; at any price less, the steam plant.

The cost of the foundations for the turbine and engines of the steam plant will be much less than the cost of those upon which the three gas-engine units are erected, and will offset to some extent the increased cost of the boiler foundations, settings, chimney, and such equipment, over that of the foundations required by the producers, scrubbers, and auxiliaries of the gas-driven station. The total floor-space occupied by the two Corliss engines, at 2·3 square feet per kilowatt, will be about 2800 square feet, and, allowing 2·6 square feet per boiler-horse-power, the station area, exclusive of turbine, will be about 5100 square feet. Assuming that the turbo-generator and electrical equipment do not require more than 900 square feet, the total area of the plant, without office or shop, will be in the neighbourhood of 6000 square feet. The area of the engine-room of the gas plant, at 3 square feet per kilowatt, will be 4500 square feet, and that of the producer,

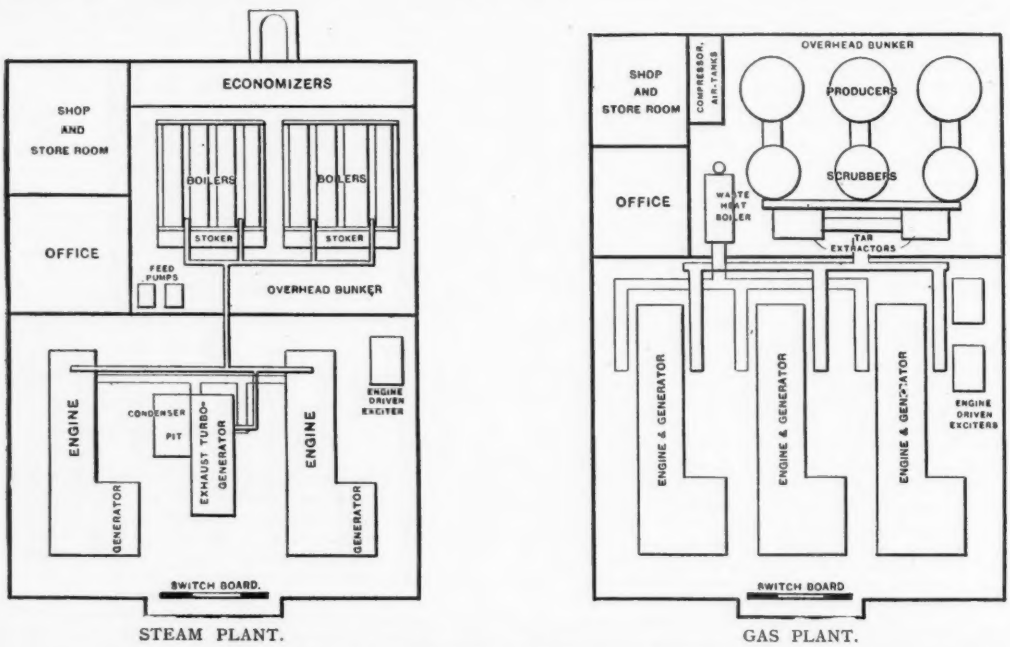


Fig. 4.—Proposed Arrangement of Steam and Gas Plants.

at 1·5, 2250 square feet—making the total plant area, exclusive of office or shop, approximately 6750 square feet.

In fig. 4 a layout of each plant is shown, planned without provision for high-tension apparatus. The producer room of the gas-plant contains a compressor and starting tanks, and a small fan for blowing-up the producers when cold. Both auxiliaries are driven by a small oil-engine. Steam is supplied to the jet-blowers of the producers by a waste-heat boiler utilizing the engine exhaust. Duplicate exciters, driven by separate engines, are provided; one being held as a reserve. The engine-room of the steam plant is also equipped with exciters in duplicate; one being direct-connected to the turbine and used to excite both generator fields when the turbine is in use; the other being engine-driven and used when the turbine is closed down. As there is little waste steam available for heating the feed-water (the condenser auxiliaries being electrically driven), the boilers are equipped with economizers.

In Table II., the total costs per year of 8760 hours have been computed for each plant; the price of coal being assumed to be $3 a ton and fixed charges—insurance and taxes on buildings and land not considered. Although the difference in cost per kw.-hour is greatest at 20 per cent. load factor, it will be seen from this table that the greatest saving per year is at a factor of 40 per cent.

TABLE II.—*Total Costs per Year, Exclusive of Fixed Charges, Insurance, and Taxes.*

Load-Factor. Per Cent.	Steam Plant.	Gas Plant.	Difference.
100 . . .	$49,756·80 ..	$51,009·48 ..	$1,252·68
80 . . .	44,893·25 ..	46,750·37 ..	2,057·12
60 . . .	40,429·15 ..	43,020·36 ..	2,591·21
40 . . .	36,749·95 ..	39,497·09 ..	2,747·14
20 . . .	33,412·39 ..	35,504·28 ..	2,091·89

If cheap condensing water is not plentiful and cooling towers are employed, an increase of about $4000 must be charged against the first cost of the steam plant. The difference in the cost of buildings, foundations, and other structural features will not exceed $6000; and this, with the cost of the cooling towers, will make a debit of $10,000 against the steam plant, on which about 10 per cent., or $1000 a year, must be charged. Thus, under unfavourable condensing conditions, the steam plant still shows a saving of $252·68 at 100 per cent. load-factor—the most advantageous factor at which the gas plant can operate.

It may be argued that the gas-producer will show better relative economy, compared with the steam-boiler, when low-grade fuels are used, than the curves in fig. 1 (which were plotted for good steam coal) would indicate. At the Government fuel-testing station in St. Louis, it was found that the fuel consumption of a comparatively small producer plant increased from 2 to 4·5 lbs. per kw.-hour when the heat value of the fuel decreased from 14,000 to 6500 B.Th.U. It may reasonably be claimed that no coal-fired boiler plant could give such efficiency on fuels that are so low in thermal units; but if the boilers be fired with producer gas, this objection is no longer valid, as they will then deliver practically the same efficiency with fuels varying widely in their thermal value. As Mr. Ernst Schmattolla observed in an article, on "Gas-Producers and Gas-Firing," in the "Mining Journal" of London, Feb. 6 last, a far more complete combustion may be attained with gas-firing than by either hand or automatic stoking, the smoke nuisance may be eliminated, and an excess of air in the furnace may be avoided.

A small thermal loss must inevitably occur when producer gas is passed through scrubbers for purification and cooling, preparatory to its use in an engine cylinder; for it is virtually impossible to utilize all the sensible heat of the gas in superheaters or boilers, and that abstracted by the scrubbing apparatus is thrown away. This loss does not occur in the gas-fired boiler, since the gases are delivered directly to the combustion chamber through a short flue and in a highly heated state. Practically all the heat radiated from the combustion chamber is taken up by the incoming air, which forms an air-jacket about it. The cost of such a producer, having no scrubbers or tar-extractors, would be largely offset by the cost of the automatic stoking apparatus required for firing the ordinary boiler-furnace.

No discussion of this subject would be complete without reference to the comprehensive paper of Mr. H. G. Stott, "Notes on the Cost of Power," read (April. 1909) before the Toronto Section of the American Institute of Electrical Engineers. It is illustrated by more than twenty cost and load curves of representative power plants of various types. From these data it would seem that, apart from hydraulic installations, the most economical type for ordinary load-factors is one in which gas-engines are used to take the low load portion of the curve, assisted by steam-turbines in carrying the peak. It should be remembered, however, that Mr. Stott deals with station capacities of not less than 30,000 kw., and inferences drawn from plants of this size may not be entirely applicable to small installations consisting of a few relatively large units, for the latter must run at low load when the load-factor drops, with correspondingly high fuel consumption. Of course, it is obvious that in a majority of reciprocating engine plants running on bituminous coal, the addition of exhaust turbines may be a better method of improving the station economy than the abandonment of steam and the installation of a producer-gas plant.

OBSERVATIONS ON RETORT-BENCHES.

At the Eighteenth Annual Meeting of the Michigan Gas Association, a paper on "Retort-Benches was submitted by Mr. A. S. B. LITTLE, of St. Louis (Mo.). The full text of the communication was given in the issue of the "American Gaslight Journal" for Sept. 27; and from it the following abstract has been prepared.

After a few introductory remarks, the author said the past thirty odd years in American retort-house practice might be correctly termed "the age of the half-depth six," as probably 50 per cent. of the horizontal benches in use were on this principle. When he was not so well versed in this class of construction, he wondered why the shallow recuperators were so much favoured, as in Europe the three-quarter and full-depth benches had held the premier position for years, due to the belief that fuel economy could only be gained by having a long and close connection in the separated waste-gas and secondary-air flues. Practical experience, however, with the half-depth bench proved why it had been preferred to all others. Personally, he would sooner have it for moderate-sized works than any European horizontal he had ever seen. It was a good gas maker, and, when handled properly, would not "eat a hole in the coke pile." But how many of his hearers could, he asked, claim that when their backs were turned the stokers handled the bench fairly? Not half the time did the furnace have good, hot coke fed into it, which meant that there was a loss of nearly 4 per cent. in the heating value of the fuel. There were many ways of arranging simple contrivances which made it quite easy to shoot the coke direct from the retort to the furnace. The best arrangement he had ever seen was in use at Roanoke (Va.). Having described this, and offered a few remarks on the firing of retorts, the author said that Mr. K. L. Simons, of Birmingham (Ala.), worked his coke-fired benches as well as anybody he had ever heard of. He used a 370-lb. charge every 4 hrs. 48 min., or five charges per retort per day. This was much better than the usual 300 to 330 lbs. of coal every four hours, as it was becoming daily more evident that a heavy charge was preferable to a light one. At Birmingham, they could burn off the 370 lbs. in four hours; but they very wisely refrained from doing so, and thereby enjoyed immunity from naphthalene troubles. They used 22 per cent. of the coke made; and reckoning 66 per cent. of coke to the coal used, they had 14½ lbs. of coke per 100 lbs. of coal carbonized. This was really excellent work for a half-depth installation using Alabama coal. They would find very few full-depth or three-quarter-depth benches doing better. He usually reckoned 28 lbs. for direct-fired furnaces, 16 lbs. for generator furnaces, 14 lbs. for half and three-quarter depth recuperators, and from 12½ to 14 lbs. for full-depth furnaces.

These remarks led Mr. Little to the much-discussed question of the depth of the bench. He said that Mr. W. A. Baehr tried to get some standard made by which one could tell exactly what was meant by half, three-quarter, and full depth. The half-depth standard was 5 ft. 2 in. from the top of the foundation to the under side of the bottom retort; and every true half-depth bench had the recuperators extending up from a paving course on top of the foundations. A three-quarter-depth furnace ought to be 9 ft. 9 in. instead of 5 ft. 2 in.; and a full-depth one need never be used on settings of six retorts. Writers differed in their views as to the minimum depth of fuel required for the constant generation of carbon monoxide; but this did not play so important a part in benches as the design of flues to get the slowest possible travel on the gases. With a minimum depth of 18 inches of good, hot coke, one could get a sufficient supply of combustible gas for heating six 9 ft. 3 in. retorts, provided they had the outgoing flues and supporting walls so arranged that the gases travelled slowly.

It might be asked why some people pinned their faith to full-depth benches. If they did so for saving fuel, he thought they were wrong. Given a furnace (say) 3 feet wide and 6 ft. 6 in. from the grate to the under side of the roof, which would mean 8 ft. 6 in. from foundation to floor, they would have a gas-producer more than sufficient to meet heat requirements, and large enough to conceal the negligence of the stokers. A number of gas engineers thought the deep bench was a condition rendered necessary by the depth of the recuperators. To a certain extent this was true, but only because of a mistaken notion as to the function of a recuperator. One of the best gas men in Europe—Mr. Charles Carpenter—had shown the phenomenal results he obtained with shallow generators. Other prominent men had proved that the true benefit derived from the deep recuperator was in the conservation of heat in the arch which would otherwise be lost by radiation and conduction. As was well known, it took a long time for fire-clay to pick up the heat from gas passing across its face; but it required scarcely measurable time for air to become heated by contact with such fire-clay. This showed that the aim of the gas manager should be to have a furnace with a good reserve of fuel space, and arrange to bring the waste gas down with a travel backwards and forwards alongside, but not touching, the furnace walls. At the top part, provision must be made for the secondary-air passages; but there was no need for any very long travel. In a 9 ft. 4 in. arch, about 24 feet was ample, provided the cross sectional area was sufficient to ensure slow movement of the secondary air. This was a positive statement,

made by reason of an actual test on some full-depth 20-feet inclines in 1896. They started with the full number of flues, but gradually shut off passages one by one till they had only three left; and the results were just as good as when the air was travelling over 80 feet in ten flues. The waste-gas flues were left the original length—giving a travel of 84 feet.

Passing on to deal with rear-clinkered furnaces, the author said they were excellent in some places; the only difficulty connected with them being to keep alive the fuel which rested on the sloping wall under the firing floor. It was too much to hope that the stokers would regularly dig up and push back this dead lump of fuel. If they built this as a vertical wall, to make all the fuel space operative, it was next to impossible to shovel fuel away back into the space towards the rear wall. The fault lay principally with half-depth furnaces; and on these it was advisable to place the ashpan as far back as possible. To have it only 6 feet long, and recess the dip only about 9 inches in the back wall of the bench, was to court failure from the start. Where coal was used as fuel, it was a simple matter to get over the difficulty; and yet, strange to say, there was only known one works where the scheme was in use, and that was the place of its inception. To Mr. H. O. Channon and his Assistant, Mr. M'Donald, of Quincy (Ill.), is due credit for this excellent innovation. It was really a treat to see the furnaces at work. They were charged with any kind of coal in any condition, about 120 lbs. at a time, broken up in the usual way after it began to coke. There was a 14-inch round hole firing-door in the back wall, and level with the bottom of it a floor of wood purlins, resting on cross girders, carrying a waggon loaded with small coal for firing the furnaces. He believed the wood strips were about 2 inches square, set 1½ inches apart, which gave light and air space to the clinkering floor, and kept the space above the platform at a good, low temperature.

The author next referred to a simple generator setting of seven retorts. He explained that under the top middle retort there was a large block extending to the front wall, where the central hole was open to the air. Here entered the oxygen for secondary combustion, and it travelled to the end, where it branched right and left, and then returned in the two side holes. At several points, it spurted into the combustion chamber. The secondary air was heated directly from the furnace gases; and the waste gases, after their passage round the retorts, went direct to the chimney. These benches were built and worked by Mr. John Young, whom he described as "one of the cleverest and most unassuming men in the gas profession." Mr. Little also gave an illustration of the full-depth settings of twelve retorts erected by Mr. Alexander Yuill, at the Dundee Gas-Works, and described by him at the meeting of the North British Association of Gas Managers in 1907.*

Looking into the future, the author remarked that as soon as gas managers found their minimum make going above 200,000 cubic feet per day, and they had a chunce of considering new plant, it was time to leave off building settings of six; and he pointed out that a number of engineers decided on putting up nines. This was a good style of bench; but it was not to be compared with the so-called "vertical eight." Unless it was treated with the utmost care and attention, trouble would arise, and very soon the cost of upkeep would show where the fault lay. The "bull's-eye" retort, as the one over the producer arch was called, had not the same chance of withstanding the heats as the others did; and the consequence was that, after two years' work, one often found this retort in a bad state of collapse. The main fault with nines was the small combustion chamber. Eights —the same style with the "bull's-eye" left out—were a little better in this respect, as they gave some distance between the point of ignition and the nearest shield tiles; but even this class of bench caused trouble, through the middle row of retorts getting too hot. It was advisable to adopt the twin rows four high for eights, instead of the triplets three high. It saved floor space, simplified the stand-pipes, reduced the cost of construction, and shortened the hydraulic mains. Twins would rest comfortably and behave well in a bed 8 feet wide, whereas triplets required at least 10 feet; and yet in the last arrangement it was impossible to get as large and convenient a combustion chamber as with the 8 feet. What might be considered the only drawback was the distance from the charging-floor to the top row of retorts—making it next to impossible to charge and draw by hand tools. However, anybody who decided on this style of bench would have machine chargers and drawers, even if they were of the manual description.

Coming to the subject of inclined retorts, Mr. Little said it was surprising to find a good number of gas engineers who almost considered the system dead; whereas others were only now beginning to realize that it had passed the experimental stage. These retorts were not favoured in London, if they excepted Mr. Shoubridge, of the South Suburban Gas Company. Despite the previous failures in certain works, he repeated in their vicinity, at Lower Sydenham, the wonderful results he obtained at Salford years before. At Brentford, similar good results had been, and were still being, obtained; and recently at West Ham good work had been done. Nevertheless, visitors to England would go to the larger companies for opinions, when, for comparison's sake, those of the independent and smaller ones were more accurate guides, as affecting American conditions. One point that must never be lost sight of was this: Any works having the equivalent of twelve double benches of eights could operate equally well with horizontals or inclines, provided in both cases charging machinery and coal-conveyors were employed. But below this capacity the economy of the horizontal working went back considerably; whereas approximately similar low costs per ton were obtained with inclines down to five benches of sixes. Even below this, inclines showed wonderful economy where horizontals could not possibly economically employ charging machinery; and he was convinced that three benches of inclined fours could be worked much cheaper than the equivalent capacity in horizontals. With inclines, muscular effort almost entirely disappeared; the only hard labour required being for clinkering the fires, which was purely a question of getting the right design of grate and producer to eliminate this source of trouble. The author said he was not going to enter into a long description of inclined retort construction, as it would do no good. Two things only were actually essential—good heats, under perfect control, and even charges. Both could be easily obtained (with correct design) when using any kind of coal varying in the same works; but they must be careful to get these. They must not expect to obtain more or better gas from inclined than from horizontal retorts; but as soon as they were allowed to send out "calorific feet" rather than "candle feet," let them by all means go in for 45° "slopers" and fill their retorts.

Mr. Little next offered some remarks on vertical retorts. He said a great deal was heard about the system employed in Europe, but not much benefit was derived from it. Nothing could ever make it clear to him that the continuous process now being tried would be successful until means were found for getting the coke out automatically without the use of mechanical appliances constructed either of steel or iron; and there would have to be some phenomenal change in the nature of these materials before a mechanical discharger could be expected to work constantly. In the case of coke-conveyors, the moving parts had to be replaced in two years, while the stationary parts were not good for more than four years. This failure of machinery being certain in handling cold coke, all in an accessible position, and capable of repair during the intermittent stops, what was to be expected when the moving and fixed parts were inaccessible, and subject to continual use on solidly packed hot coke, with its attendant water slaking? He thought that nothing but the highest praise could be given to Messrs. Woodall and Duckham for the wonderful demonstrations they had made; but, at the same time, one did not detract from their labours when he boldly faced the limits of successful work in automatically handling coke. What Messrs. Glover and West would finally do at St. Helens was a matter of conjecture. With the intermittent vertical retort, the element of failure to which he had referred was not a factor in the success or non-success of the system. The inventors and users of the Dessau and other German systems had demonstrated what nobody ever doubted. They had made a success of what many tried; but, unlike those trying for continuous work, they had not endeavoured to do what had never before been accomplished.

The concluding portion of the paper was devoted to the subject of the construction of retort-benches. The author's advice was this: "Get your design right with regard to flue sizes, retort number and disposition, and then reduce the elements of construction to the most simple in shape and number suitable for the situation, but at the same time also suitable for the man who has to put them together. Give a good mason (or, as it is preferable to call him, a retort-setter) a quantity of bricks of varying thicknesses, and he will lay them up in almost any desired shape. Cut out the blocks and tiles as much as you possibly can." He assured his hearers that this was no attempt to foist on them any pet theory of his own, but was a very earnest attempt to show them the advantages of the old and tried method of construction. He used the idea himself because he thought it the best; and service had proved it to be so. When they needed new benches, their aim should not be solely to dissect the designs of the brick and clay work. There was room also for great improvement in parts of the ironwork.

* See "JOURNAL," Vol. XCIX., p. 386.

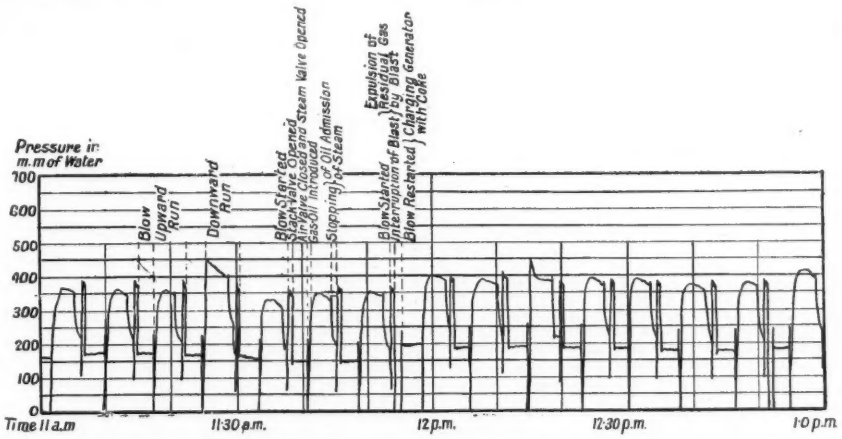
Determination of Water in Tar.—This subject was dealt with by Herr H. Beck in an article in the "Chemiker Zeitung." According to an abstract translation in the "Journal of the Society of Chemical Industry," the estimation of water in tar is usually made by distilling about 1 kilo. of the tar in a metal flask of about 2 litres capacity, until the oil distilling over is free from drops of water. The operation takes from three to four hours; and there is always danger of the liquid frothing, and thus boiling over. The time is much shortened, and the operation simplified, if a given quantity of the tar is run slowly into a metal flask containing "heavy oil" heated to from 250° C. to 270° C. The rate of flow of the tar into the flask is regulated so that, although the vaporization of the water is instantaneous, there is no frothing; and when all the tar has been run in, the temperature of the oil is raised to about 300° C. to drive over all water vapour. Any water remaining in the condenser tube is rinsed into the graduated receiver with a little xylol; and after standing for a short time in a warm place, the volume of water is noted. The method was tested upon known mixtures of dehydrated tar and water, and gave very satisfactory results. The operation, with a 50 per cent. mixture, was easily carried through in the course of about 35 minutes.

CONTROL OF WATER-GAS PLANT AND VALUATION OF GAS OIL.

The last number to hand of the "Journal für Gasbeleuchtung" contains an article by Herr L. Kalbfuss, Assistant at the Darmstadt Gas-Works, on gas-making trials in carburetted water-gas plant, and the determination of the gas-making value of carburetting oils. The matter is dealt with partly from the standpoint of the consumer of German mineral oils, which are not used in this country for gas making; and these portions of the paper will be passed over very briefly in the following summary of its contents.

The high price of petroleum oils in Germany makes it more than ordinarily imperative that economy should be practised in their utilization for gas making; and on this account special attention is given to preliminary tests and trials of samples of oil and of variations in the methods of working the water-gas plant. Communications published on the matter deal largely with the valuation of the oils for gas making from the standpoint of the illuminating power of the gas produced in the plant; whereas at the present day it is in German gas-works now necessary only to take account of the calorific power. The author of this communication treats the valuation of gas oils from the standpoint of the calorific power of the oil and of the gas made from it.

The water-gas plant at the Darmstadt works was erected by the German Water Gas Lighting Company, of Berlin, and brought into operation on June 1, 1908. It comprises two sets, each of a productive capacity of 441,450 cubic feet of carburetted water gas per diem. Allowing for three pauses for clinkering, of from half to three-quarters of an hour duration, each set should have a normal productive capacity of 19,600 to 20,300 cubic feet of gas per hour. By careful observation of the make of gas, and with corrections for variations of temperature and pressure, the working of the plant is controlled so as to maintain a uniform and good yield of gas of uniform calorific power as registered on a Junkers recording calorimeter.



Typical Pressure Record for Controlling the Working—Taken by the "Heinrich-Pforzheim" Pressure Recorder.

TABLE *Showing the Mean Results Obtained with Five Varieties of Oil.*

Gas Oil.	Specific Gravity of Oil at 59° Fahr.	Make of Gas per Hour per Set. Cubic Feet.	Mean Gross Calorific Power of Gas B.Th.U.	Mean Consumption of Coke.		Mean Consumption of Oil.		Cost of Oil at Works per Ton.	Cost of Coke (at £1 0s. 4d. per Ton) and Oil for Volume of Gas representing 1,000,000 B.Th.U.
				Lbs. per 1000 Cubic Feet of Gas.	Lbs. per Million B.Th.U. in the Gas.	Lbs. per 1000 Cubic Feet of Gas.	Lbs. per Million B.Th.U. in the Gas.		
								£ s. d.	s. d.
No. I. German	0·866	21,190	550	30·6	55·6	28 0	51·2	4 16 1	2 8½
No. II. Austrian	0·858	20,483	554	31·1	56·2	26·4	47·8	4 10 6	2 5
No. III. Austrian	0·862	21,825	548	34·2	73·4	26·6	48·4	4 10 6	2 7½
No. IV. Austrian	0·877	21,507	520	33·3	63·9	27·4	52·8	4 10 11	2 8¾
No. V. Austrian	0·866	21,260	527	33·3	63·4	27·8	52·8	4 12 6	2 9

The trials made extended over a long period; and it was impossible to weigh exactly the whole of the coke used. The generators were, however, charged from conical iron hoppers, which were filled with large coke; and the average weight contained in a hopper was pretty uniformly 595 lbs. The oil was measured by Kennedy's piston measurer, and the weight of a litre of the warmed oil was ascertained by direct weighing. The gas made was measured by a station meter placed after the equalizing gasholder, the contents of which were taken into account with each reading of the meter. Towards the end of the trials, a Strache "Autolysator" was installed for obtaining a continuous determination and record of the percentage of carbonic acid in the gas. It was connected to the main between the equalizing gasholder and the meter. The curves obtained with it show regularly recurring fluctuations, which indicate that during the runs a stream of gas passes directly from the inlet to the outlet pipe of the equalizing gasholder. This holder therefore serves only to take up the excess of gas made during the runs, and to send out this excess during the blows; but it does not give a proper mixing of the gas which is poor in carbonic acid from the beginning of the run with the gas which is rich in carbonic acid from towards the end of the run. Consequently, it is undesirable to pass the carburetted water gas directly into the coal-gas holder which is being used at the time for distributing gas into the town, as the result would be that there would be great want of uniformity in the distributed gas. There are also some small variations in the curves, which apparently must be due to the construction of the calorimeter, because they occurred also when the instrument was used on the gas in the town.

The plant was ordinarily in action only for seven to eight hours every day; and only the last five or six hours of each day's working were taken for estimating the value of the oil in use. Four varieties of gas oil of Austrian origin and one of German origin were tested. The Austrian oils were selected merely on the ground of their cheapness; and the results showed that the dearer kinds were not generally better in quality. The blows were of 2½ minutes' and the runs of 5½ minutes' duration; and 35 litres (7·7 gallons) of oil were used in each run. The variations of pressure in the generator were registered by means of a pressure recorder, which proved useful in controlling the working of the apparatus. These records are of some interest as showing the variations in pressure which occur in the course of the series of operations in the working of the plant. A typical record of the pressure indicator is reproduced. The table shows the mean results obtained with the five varieties of oil.

It appears from the results shown in the table that, taking coke at the same value throughout, the No. II. oil was the cheapest on the basis of the calories obtained in the gas. If this oil is given the value of 100, the relative or percentage values of the other oils should be: No. I., 93·7; No. III., 90·8; No. IV., 87·2; and No. V., 87·4. The calorific value of oils Nos. II. and III. was determined with a view to ascertaining the thermal efficiency of the plant. The net calorific value of No. II. oil was 19,926 B.Th.U. per lb., and of No. III. oil 18,509 B.Th.U. per lb.; and taking the calorific value of the coke at 12,960 B.Th.U. per lb., the unit of heat contained in the oil and coke per cubic foot of carburetted water gas made were for No. II. oil 928 B.Th.U., and for No. III. oil 935 B.Th.U. The net calorific value of a cubic foot of the gas was, however, from No. II. oil 515 B.Th.U., and from No. III. oil 510 B.Th.U. These figures represent 55·5 and 54·6 per cent. respectively of the calorific value of the coke and oil used per cubic foot of gas made. Hence there is used up in the apparatus for the conversion of the fuel into gas, and in the formation of tar and oil-coke, and in various losses, 44·5 and

45·4 per cent. of the calorific value of the coke and oil employed in the plant. It is possible at any time to check the coke and oil consumption per 1000 cubic feet of gas made; and, by comparison with the earlier results obtained from similar oil, or from a sample of oil of standard quality, to check the quality of the oil in use at the time. The recording appliances for controlling the working of the plant render it easy to reproduce the same working conditions as obtained in the trial runs.

SCOTTISH JUNIOR GAS ASSOCIATION.

EASTERN DISTRICT.

About forty members of the Eastern District Section of the Scottish Junior Gas Association paid a visit on Saturday afternoon to the works of the Pumpherston Oil Company, Limited, near Uphall. They were met at the gate of the works by Mr. J. Boyd (Under Manager), Mr. E. Bailley (Chief Chemist), and Mr. R. Montgomery (Engineer); and these gentlemen became the guides of the party.

It was explained to the members that the shale was brought from the pits, at a considerable distance, in pit hutches, drawn by wire rope. Tipped into the breakers, it fell into hutches with trap bottoms—on one side of the breaker to be sent up the sloping railway to the top of the retort-bench, and on the other side to be stored in large hoppers for use on Saturday afternoons and Sundays, when the mines are closed. The company walked to the top of the retort-bench, and had explained to them the method of charging the huge vertical retorts, which are built according to the patent of Mr. J. Bryson, the Manager. There are three stacks in the bench, containing, in all, 60 retorts. Descending to the ground, the method of taking away the spent shale was explained—an operation which must be done twice during a shift. The arrangements for drawing off the vapour distillate, which is effected by exhausters placed after the condensers (these, by the way, being huge batteries of 4-inch pipes, vertical), were examined. The incondensable gas is returned to the retort-bench, where it is used as fuel. The condensed liquid is run into tanks, in which the ammoniacal liquor and oil separate. The liquor passes to the sulphate plant, which is an ordinary oil-works continuous process, improved by Mr. Bryson. The yield per ton of shale is 48 lbs. or 50 lbs. of sulphate, very white in appearance and finely crystallized. The crude oil is sent into the refinery, where it is heated in stills placed over tar furnaces, and the resulting vapour condensed; driving off in the first process naphtha, in the second green oil, and so on in several successive runs, to produce the different qualities—the oil after each run being sent to another department to be treated, first with acid and afterwards with soda. The process is known as Henderson's continuous, which is based upon the fact that the oil does not give off all its products in one run through the stills. Thus, for instance, the first run does not take out all the naphtha, but only the lighter sorts, which are made into benzol and motor spirit. When the green oil is sent through the still, the first product yielded is again naphtha. The visitors were informed that the oil may come back to the stills a dozen or more times before it yields up all its products. Much interest was taken in the process of extracting the scale, or wax, from the oil, and the repeated sweating of the wax to extract the tar and oil from it, till a very hard and pure white substance is obtained; also in the care taken to eliminate all trace of oil and tar from the water effluent—chiefly from the ammonia plant.

The production of the oil and other substances is a long and continuous process, which is very simple in appearance, now that it has been discovered, but which was evolved only by dint of much thinking combined with long experience. The continuous and repeated treatments were a revelation to the visitors, who were not slow to admit that, compared with oil making, the making of coal gas is but child's play. The size of the works will be understood when it is mentioned that the make of oil per annum is 20 million gallons. In the laboratory there was shown a preparation clear as water, which has been named "Solvine," of which 2000 gallons have been sold to the South Metropolitan Gas Company—used to prevent deposition of naphthalene.

At the close of the walk round the works, the visitors were entertained at tea in the concert and lecture hall of an institute which has been erected by the Company for the benefit of the workmen.

The President (Mr. H. Rule, of Falkirk) said the members had seen the most up-to-date works of the Pumpherston Oil Company, and the whole process of the manufacture of oil from the raw product, shale. He was afraid they in the gas industry were accustomed to imagine that in the handling and carbonizing of coal they were ahead of all others; but he left it to the members to say now whether, in cost or in plant, they could beat anything they had just seen. It was, at any rate, significant that the whole trend of gas-making operations at the present day was towards the manufacture of coal gas in vertical retorts, such as the members had seen at work. To all of them, especially those who had visited oil-works for the first time, it had been a very great treat indeed. On more than one occasion, he had said that the success of the Association depended to a great extent upon the kindness of such undertakings as the Pumpherston Oil Company in throwing open their works for inspection. He repeated this statement; and he was sure that the members who were present would agree with him that they had begun their visits this session in a most auspicious manner. They were much indebted to the Directors of the Company for their kindness and hospitality; and he begged to propose a hearty vote of thanks to them, and also to Mr. Boyd, Mr. Bailley, and Mr. Montgomery, who had had a hard afternoon's work answering all the questions put to them.

Mr. Boyd returned thanks for the very flattering things which had been said of them. They were more than pleased to have such a scientific body at the works, and to answer all their questions. He wished they had more of such societies coming to see them. They had visits from art and industrial societies, the questions put by whom, after an hour or two of explanation, fairly floored them; but they had had nothing of the sort that day. He hoped the Association would visit them again, and when they did so there would be something new for them to see.

The party were then shown over the institute, which contains a library in which there are 2000 volumes, a reading-room, recreation-rooms (including a billiard-room), and baths. The institute is so popular that, from the revenues—partly voluntary contributions by the workmen, and partly the drawings at the billiard-tables—the Committee in charge are able to spend upwards of £100 a year in providing lectures and concerts, and to keep the library and reading-room supplied with popular literature.

The visitors were driven from the railway station to the works, and back again, in brakes provided by the Company.

REGISTER OF PATENTS.

Charging Gas-Retorts.

Robert Dempster and Sons, Limited, and Toogood, H. J., of Elland.

No. 20,851; Oct. 3, 1908.

This invention relates to apparatus especially suitable for use in connection with that described in patent No. 19,437 of 1908.

According to our present invention (which was fully described and illustrated in the "Journal" for Oct. 19, p. 179), the patentees propose to deliver the coal to the retorts from a travelling hopper, truck, or similar appliance, through a movable shoot, which enters for a certain distance into the mouthpiece and the retort in charging. Upon the retort being filled up to the point at which the coal reaches and seals the lower aperture of the shoot, the flow of coal down the shoot is stopped until the shoot is raised. Such raising of the shoot then cuts off the supply of coal to the upper aperture of the shoot; and the shoot, on being raised, empties itself into the retort—completing the charge.

Where the coal is fed at one side of the retort, as described in the earlier patent, the lower aperture of the shoot during the charging operation may be inclined at an angle to the axis of the retort; and the shoot, in rising, delivers over the part of the retort not previously filled the small quantity of coal remaining in the shoot—the capacity of the shoot being such as to regulate this according to requirements.

By this means, it is pointed out, an intermittently charged retort is made to act as its own measure—that is to say, it cannot be overcharged or undercharged; the charge being automatically adjusted to the capacity of the retort. The importance of this will be obvious, as it is well known that a retort, when fouled with a deposit of carbon, will hold less coal by (say) 2 cwt. or 3 cwt. than when in a clean condition, after being scurfed. Also, if the travelling hopper be charged from overhead bunkers, and the door of the bunker remain open during the charging of one retort, the hopper will be full of coal after the charging has been completed. This coal may then be used to charge the next succeeding retort; and, consequently, it is only necessary to open one of the doors in the storage bunker for every two retorts charged.

Purifying Gases.

Burkheiser, K., of Aix-la-Chapelle.

No. 20,920; Oct. 3, 1908. Date claimed under International Convention, Oct. 14, 1907.

This is a process for obtaining bye-products from tar-free gas mixtures containing sulphuretted hydrogen and ammonia with simultaneous purification of the gas, by causing the gas mixture to pass over a heated oxygen-yielding mass and continuously or intermittently regenerating the mass so that the sulphurous anhydride produced reacts with the ammonia present to produce ammonium sulphite or sulphate, or both.

The patentee points out that the processes heretofore used in the production of coal gas and coke and other distilling operations, for the purpose of cleansing the crude gases and securing valuable bye-products therefrom, are mainly directed to the production of sulphate of ammonium. The necessity for using large quantities of sulphuric acid and extensive apparatus for this purpose involves very considerable cost and working expenses. His invention therefore has for its objects "to simplify and cheapen the obtaining of the bye-products, with simultaneous purification of the gas."

It is well known, he says, that heated oxides—more particularly oxides of iron—are adapted to cleanse coal gas by contact therewith, and purifying processes have been proposed in which the iron, reduced from the oxide, is to combine with the sulphur contained in the gas, thus freeing the gas from one of the principal impurities present. It has also been proposed to pass coal gas, previously freed from tar, through hydrated peroxide of iron heated to a temperature of 240° Fahr. to 420° Fahr., for the purpose of decomposing the sulphur compounds in the gas and producing sulphuretted hydrogen, which can be removed by ordinary means of purification. Coal gas has also, for purifying

purposes, been conducted over oxides and hydrates other than those of iron, heated to a temperature below dull redness.

He has, however, found that, by passing the gas which contains ammonia over an oxygen-yielding mass—for example, bog iron ore—and arranging for a continuous or an intermittent regeneration of the mass by means of a supply of free oxygen, the oxygen liberated from the mass, together with the added oxygen, reacts with the sulphur contained in the gas as sulphuretted hydrogen, to produce sulphurous anhydride, which then reacts with the ammonia in the gas to separate the latter in the form of sulphite or sometimes of sulphate.

The reactions are represented as follows:—

$$H_2S + 3O = H_2O + SO_2$$
$$SO_2 + NH_3 + H_2O = NH_4 \left\{ \begin{matrix} H \\ \\ NH_4 \end{matrix} \right\} SO_3$$
$$SO_2 + 2NH_3 + H_2O = NH_4 \left\{ \begin{matrix} NH_4 \\ \\ NH_4 \end{matrix} \right\} SO_3$$

In order that the reactions may be as represented, the oxygen-yielding mass must be continuously regenerated—that is to say, air or pure oxygen must be mixed with the coal gas. The bog-iron ore, reduced to a highly porous state by combustion of the organic matter therein, only furnishes the oxygen required to convert the sulphuretted hydrogen into water and sulphur; the nascent sulphur being oxidized by oxygen introduced with the gas. Some of the oxygen introduced regenerates the ore by re-converting the ferrous oxide into ferric oxide.

If, however, the regeneration is not continuous but is intermittent—that is to say, is performed by passing air or pure oxygen over the oxygen-yielding mass alternately with the gas—the reactions may be represented as follows:—

$$Fe_2O_3 + 3H_2S = Fe_2S_3 + 3H_2O \text{ (absorption of } H_2S)$$
$$Fe_2S_3 + 9O = 3SO_2 + F_2O_3 \text{ (regeneration)}$$
$$SO_2 + NH_3 + H_2O = NH_4 \left\{ \begin{matrix} H \\ \\ NH_4 \end{matrix} \right\} SO_3$$
$$SO_2 + 2NH_3 + H_2O = NH_4 \left\{ \begin{matrix} NH_4 \\ \\ NH_4 \end{matrix} \right\} SO_3$$

With this intermittent regeneration, the sulphur is bound during the passage of the gas over the oxygen-yielding mass. The subsequent regeneration of the mass causes sulphurous anhydride to be evolved; and this anhydride reacts with the ammonia originally contained in the gas. The ultimate result is thus the same as when the oxygen-yielding mass is continuously regenerated as described.

The resultant product also contains, however, some sulphate of ammonia. This may be due to the oxidization of sulphite, or to the conversion of sulphurous anhydride into sulphuric anhydride.

The gas is freed from tar in the usual manner before its passage over the heated oxygen-yielding substance. Dense, heavy vapours are produced, which solidify into a crystalline mass. The latter can be directly used as manure, or may be employed as material for the manufacture of other ammonium compounds. Under normal conditions, the heat liberated by the reaction is sufficient to secure continuity of the process. For continuous regeneration of the oxygen-yielding substance, air or pure oxygen is preferably added to the crude gas, as has been heretofore proposed with reference to the regeneration of the spent hydrated ferric oxide in the process of separating sulphuretted hydrogen from gases of distillation. If the process of regeneration is intermittent, the oxygen-yielding mass is raised to a temperature of about 120° C., and preferably not to a temperature much exceeding this; since otherwise sulphur is liable to be carried away by the stream of gas. It is probable, he remarks, that, with intermittent regeneration, higher temperatures cause Fe_2S_3 to become $2FeS + S$. If the process of regeneration is continuous, higher temperatures may be used, since the sulphur liberated is directly oxidized; but in any case the temperature should not exceed approximately 400° C. The proportion of sulphate produced increases with increasing temperature, provided there is sufficient oxygen present. The amount of oxygen introduced must, of course, be proportionate to the amount of sulphur in the gas, since it is used for its oxidation.

The apparatus required for the process is very simple, and the process is said to be extremely cheap and economical, both as a purifying process and as a method of obtaining bye-products. In this connection, attention may be called to an article descriptive of the process appearing on p. 311 of to-day's issue of the "JOURNAL."

Controlling Gas-Lights from a Distance.

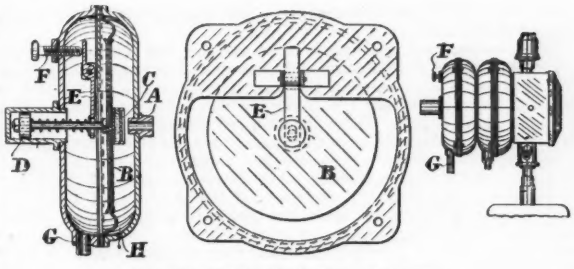
TOURTEL, J. M., of Chiswell Street, E.C., and MEALING, W. R., of Twickenham, S.W.

No. 21,185; Oct. 7, 1908.

This apparatus, for lighting and extinguishing gas-lamps by varying the pressure in the mains, relates to the class of such plant in which a diaphragm or liquid-sealed bell (provided with means for turning on and off the supply of gas to the burner) is connected to the gas supply, and is subjected to substantially the full pressure of the gas when a predetermined maximum pressure is reached, and is subsequently opened to the atmosphere for the purpose of discharging the gas it contains at a predetermined minimum pressure.

The illustration shows the escape-controlling diaphragm, and a side view with part of the diaphragm case removed; also the escape-controlling diaphragm fitted to a tap-operating diaphragm which may be substantially as that described in patent No. 7197 of 1907.

The escape-controlling diaphragm case is fitted by the connector A to the diaphragm case which contains the diaphragm operating the tap mechanism. The diaphragm B consists of a flexible web arranged between two metal plates, and has upon it a valve C, preferably formed



Tourtel and Mealing's Lamp Controller.

of felt with a leather face so arranged as to fit over the passage through the connector. A spindle fixed to the diaphragm carries a spiral spring, which presses against the nut or block D at one end, and against the slotted or forked end of a pivoted lever E, under the control of an adjusting screw F. The tendency of the spring is to draw the diaphragm with the valve away from the outlet; but as gas is admitted through the tube G to one side of the diaphragm, the pressure of the gas above a certain predetermined minimum, acting upon the surface of the diaphragm, overcomes the pressure of the spring and closes the valve C on to the connector H.

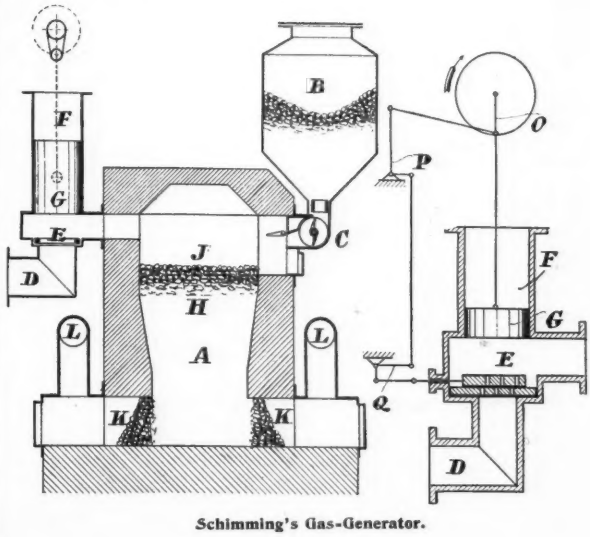
The gas pressure, having been admitted to the diaphragm, causes it to operate the gas-tap; and the same pressure will have closed the diaphragm tightly over the outlet, which will remain closed until the pressure falls to the minimum, which must be sufficiently low to enable the spring to overcome the pressure of the gas and to withdraw the diaphragm and the valve so as to allow the gas to escape through the outlet H to the air, and so permit the return of the diaphragm to its normal position.

Gas-Generators.

SCHIMMING, G., of Berlin.

No. 21,660; Oct. 13, 1908. Date claimed under International Convention, Oct. 14, 1907.

The patentee says: In order to obtain gas as far as possible free from tar from coal rich in gas, use is made of the ordinary method of conducting the gas in the direction of the freshly introduced coal downwards through the incandescent layer to the support of the fuel. Owing to this manner, the products of distillation of the layer of incandescent materials which are still evolving gas decompose in passing the layer of incandescent materials which have already been exhausted of products of distillation. In this process, two drawbacks arise, the removal of which forms the object of the process carried out in the generator to be described. After the introduction of fresh fuel, considerable quantities of tarry vapour are evolved, in consequence of the heat of the generator and the hot layer on which the fresh coal is distributed, the decomposition of which vapour causes difficulties in consequence of its evolution in large quantities; so that soot and tarry vapour escape. With caking coal, there is formed, after the feed, a large quantity of a thick kind of tarry coating, which also leads to irregularities in the working of the generator.



Schimming's Gas-Generator.

In order to diminish these two drawbacks, the generator is provided with one of the arrangements by means of which the fuel is mechanically fed, continuously, in small quantities. With very rich gas coal, the gas-producing process proceeds too slowly in the case of gas removal and generation in a downward direction, as heat is only slowly conveyed by conductivity by the radiation of the walls and by immediate contact with the incandescent material. In order to accelerate the transmission of heat to the freshly-fed coal, recourse is had to the following means: The air supply is periodically interrupted—for instance, 120 times per minute—and the gases formed from the combustion air introduced during the cessation of the air supply, partly expand

upwards from the incandescent zone and penetrate into the layer of freshly-charged fuel.

With certain coal, gas free from tar and the like is only with considerable difficulty obtained; and this means for accelerating the transmission of heat between the incandescent coal layer which has already been distilled and the coal layer which has yet to be distilled does not alone suffice. For such coal, recourse is also had to the following means: The volume of the space above the fuel is periodically diminished and enlarged—by means, for instance, of a piston working in a cylinder open to the space above the layer—so that when the piston is at the top of the cylinder the total volume of the space above the fuel is much greater than when the piston is at the bottom of the cylinder. By this means, the hot gases which are extracted from a lower layer are periodically passed back into a higher layer. In this way, the heat produced by the combustion of the coal is periodically transmitted to the coal which is about to be consumed. There takes place, however, also, a partial mixture of the hot combustible gas derived from the gas production, which is drawn back again with the tarry vapour and the air for combustion; and "thereby a partial combustion is produced, so that there arises periodically for this reason a great development of heat in the upper layer from which the gas has not been removed."

The process described is carried out in the generator shown. The coal is fed from a container B, by a distributor C, uniformly and continuously on to the surface of the layer of fuel in A. The supply of air enters through a pipe D, provided with a valve E, to periodically interrupt the flow of the air. The valve and piston work in conjunction with each other, and are suitably connected up for the purpose as in the example shown, in which the piston G is operated by the crank O, which also operates the valve E through the intermediary of cranks P and Q. By this arrangement, the valve is closed during the up-stroke of the piston and open during the down-stroke—opening at the beginning of, and closing at the end of, this latter stroke. As the piston rises in the cylinder F, it draws the gaseous products out of the layer H into the layer J; and on the piston descending and the valve E opening, the heated products pass back to H and combustion air flows through J to H.

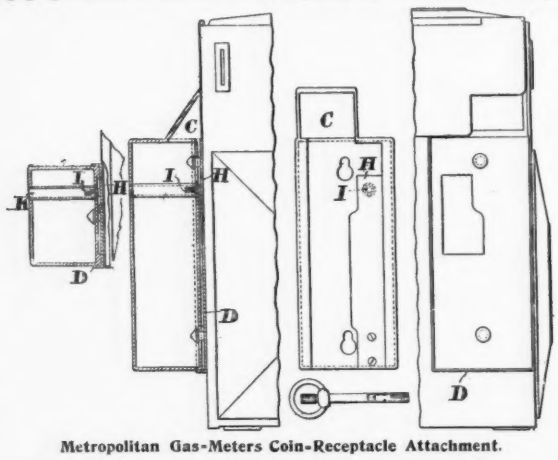
Instead of producing the periodical passage of the gaseous products through the layer from which the gas is to be removed, by means of an alteration of the volume of the space on the air-supply side of the generator (by means, for instance, of the piston G and cylinder F, as shown), it may be produced also by periodically drawing off and forcing back the gas produced at the gas removal end of the generator—using, for instance, a pump similar to F and G, and a gas-outlet valve similar to E; the pump and valve being arranged in the gas-collecting pipe L, and operated as described—the piston forcing the gas back through the combustion chamber to the newly-charged fuel when the outlet valve is closed.

Prepayment Gas-Meters.

METROPOLITAN GAS-METERS, LIMITED, and FORSTER, J. D., of Nottingham.

No. 1914; Jan. 26, 1909.

This invention relates to the combination with the meter-casing of a coin-receptacle which is locked thereto by means of stud-and-slot connections, and by means of a spring is secured upon the receptacle, engaging a recess or the like on the adjacent face of the meter-casing.



Metropolitan Gas-Meters Coin-Receptacle Attachment.

As shown, the upper end of the coin-receptacle is provided with an inclined extension C forming an opening so designed that, when the receptacle is against the meter-casing, it will coincide with the opening through which the coin is discharged. The meter-casing, at the part to which the coin-receptacle is to be applied, is fitted with a guide-plate D carrying studs designed to engage with slots formed in the inner side of the coin-receptacle A. The spring tongue H is attached to the inner side of the coin-receptacle; and a screw-pin I, secured to the upper or free end of the tongue, extends through the hole in the coin-receptacle, which is also provided with the corresponding hole K in its outer side—being connected by a tube which extends transversely across the inside of the receptacle and serves for the introduction of the key. This comprises a stem provided with a handle and made hollow (as shown) at its outer end; the hollow portion being internally screw-threaded so as to engage with the screw-pin I.

To apply the coin-receptacle, it is placed against the guide-plate D, and pressed downwards, so that the narrow portions of the slots engage beneath the heads of the studs, and the spring tongue H snaps into the recess in the guide-plate, which, in conjunction with the studs and slots, securely locks the receptacle in position. To unlock the coin-receptacle from the meter, the key is inserted and turned so as to cause the internal screw-thread in its hollow end to engage with the screw-thread I. The latter can then be drawn forwards by means of the key, so as to withdraw the spring tongue H from engagement with the recess in the guide-plate.

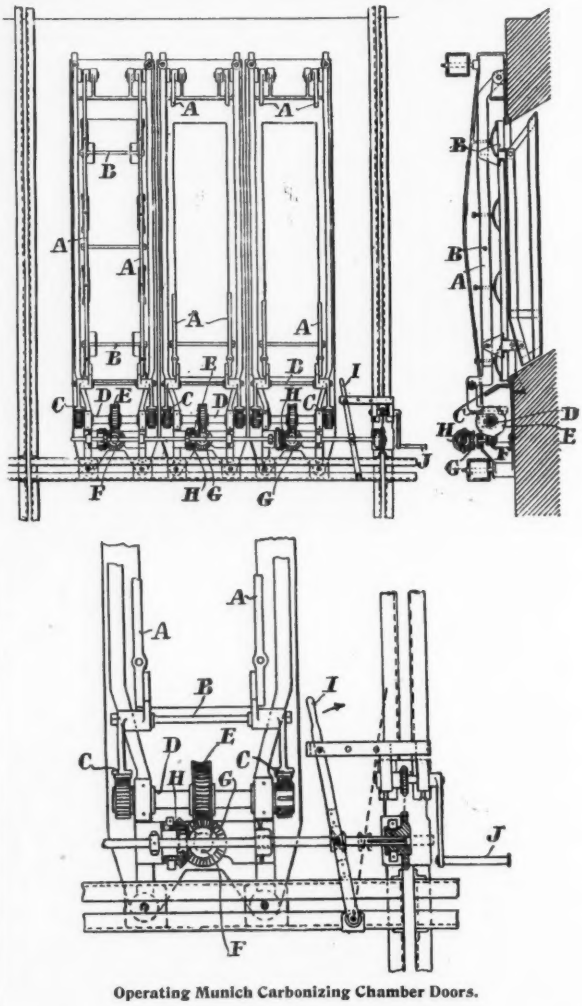
Actuating the Doors of Retorts, Coke-Ovens, &c.

OFENBAU GESELLSCHAFT M.B.H., of Munich, Germany.

No. 3678; Feb. 15, 1909. Date claimed under International Convention, Feb. 20, 1908.

This invention relates to apparatus for actuating from a distance the doors of retorts, coke-ovens, and the like, of the type wherein the doors can be individually operated from a single coupling rod by means of toothed gearing.

Hitherto, the patentees point out, when retorts or ovens have been arranged side by side, the discharge of coke has been effected either automatically by the weight of the incandescent mass sliding downwards on the inclined floor of the retort, or, in the case of the floor of the retort being horizontal, by means of a coke-ejecting machine, or of a "drawing" machine—in all cases the door being first unlocked and



Operating Munich Carbonizing Chamber Doors.

opened either mechanically or by hand. The doors of such individual retorts have, in previous constructions, been pivotally mounted above the opening of the retorts; while the bracket of the door supporting the door-plate proper is provided below the opening of the retort with teeth, which, on the door being closed, come into engagement with a pinion mounted on the setting of the furnace. Each of these pinions can be rotated—for instance, from a spindle by means of a worm; and in this way each individual door is locked or released from a distance according to the direction of rotation of the spindle. As hitherto, the rod carrying coupling members is mounted on the furnace in a rotatable manner, and is axially movable relatively to toothed pinions whereby the doors are actuated. According to the present invention, however, the pinions are provided with hollow hubs through which the coupling rod passes, and the coupling members on the rod are so relatively positioned that they are adapted to be brought into consecutive engagement with the hollow hubs to lock them to the shaft when the latter is moved longitudinally.

The illustrations show the invention as applied to a furnace having inclined retorts.

Here three adjoining retorts have their discharge openings set in frames let into the brickwork of the furnace and held in place by blocks or washers and bolts engaging channel irons arranged adjacent to the furnace. The doors for the discharge openings (in themselves old) preferably each comprise a door-plate closing the frame, adjustably

mounted through springs on lugs secured to brackets A, pivoted about pins in the frame above each discharge opening, and connected securely together by transverse bolts and provided below the discharge openings—where their ends are made U-shaped—with toothed racks C. On the doors being closed, the racks of the two brackets of each door engage pinions mounted on the ends of a spindle D supported in the frame below the shoot or inclined plane forming the continuation of the chamber floor. Between the pinions there is secured to the spindle D a worm-wheel E constantly meshing with a worm F, the spindle of which is also supported in the frame and carries at its outward end a bevel pinion G. Each bevel pinion is in constant engagement with a bevel pinion H, and all the pinions are disposed at right angles to the plane of the furnace doors, and are so mounted that they can rotate but not move axially.

The hubs of the bevel pinions are formed hollow; and through these openings a thin rod passes, which is rotatably and adjustably mounted at several points in the frame of each retort, and is carried at one end of the furnace in a bracket secured to the channel irons. To the rod are secured, at each bevel pinion, toothed coupling discs, which serve to clutch the pinions to the shaft when brought into engagement with the hollow hubs of the bevel pinion H, which are provided with corresponding clutch teeth. The distance between the coupling discs is calculated so that, when the bevel pinion H of a given door is connected to its respective clutch disc, all the other bevel pinions remain out of engagement with their respective clutch discs.

If, now, for instance, the contents of that retort which in fig. 1 is farthest from the operating lever I are to be discharged, the lever is brought into the outermost position shown, whereby a coupling disc is brought into engagement with the coupling teeth of the bevel pinion H belonging to that retort. After the lever has been fixed, the crank J is rotated to the release of the door, whereupon the clutch rotates the bevel pinion; and as the latter is connected to the brackets A of the door by means of the bevel pinion G, the worm F, worm-wheel E, and pinions, the toothed racks on the brackets of the door will be brought out of engagement with the pinions. The door, thus released, can then be entirely opened by any suitable means, so that the incandescent coke is discharged down the shoot.

When the door is being closed, the toothed racks C of the brackets A return in such position relatively to the pinions that they are engaged by the latter when the crank J is rotated in the opposite direction to formerly. In this way, the brackets are pressed against the furnace, and, consequently, the door-plate is forced against the frame owing to the action of the springs.

For the purpose of releasing the door of the central retort, the hand lever I is turned in the direction of the arrow into its central position, whereby the coupling disc corresponding to this retort is brought into engagement with its respective corresponding bevel pinion H; while the coupling disc of the retort on the left-hand side is disengaged from its pinion, and the clutch of the right-hand retort is not yet in engagement with its particular pinion. Consequently, by properly adjusting the hand lever I and rotating the crank J, the door of any individual retort can be released or locked at will.

APPLICATIONS FOR LETTERS PATENT.

23,807.—MANSELL, W. H., and CRAGGS, G. C., "Gas-stoves, &c." Oct. 18.

23,831.—LAKE, H. W., "Manufacture of gas from liquid hydrocarbons." A communication from the Hydrocarbon Converter Company. Oct. 18.

23,909.—POTTER, W. G., "Gas-driven hammers." Oct. 19.

23,910.—POTTER, W. G., "Pumps driven by gas-engines." Oct. 19.

23,914.—SHAW, J., "Regulating valves." Oct. 19.

23,955.—POTTER, W. G., "Gas-engines." Oct. 19.

23,988.—WAKEFIELD, C. C., "Acetylene apparatus." Oct. 19.

24,014.—THIL, H. A. DU, "Gas-producers." Oct. 19.

24,019.—ARMSTRONG, WHITWORTH, AND CO., LTD., and SODEAU, W. H., "Increasing the energy of stored compressed air or other gas capable of supporting combustion." Oct. 19.

24,030.—FIELDING, J., and EADY, R. G., "Purifying and washing gas." Oct. 20.

24,080.—BARNES, J., "Smoke consumer for inverted incandescent gas-lights." Oct. 20.

24,095.—BLAND, C. W., "Inverted burners." Oct. 20.

24,122.—DEUTSCHE GASGLUHLICHT AKT.-GES. (AUERGESELLSCHAFT), "Inverted mantles." Oct. 20.

24,211.—CHALLIS, C. E., "Heat-distributing mats or toasters for use on gas-stoves." Oct. 21.

24,215.—BOTTELEY, A. A. T., "Grill-tins for use with gas-stoves." Oct. 21.

24,261.—BURSTALL, F. W., "Extracting or separating suspended matter from gases, particularly tar from combustible gases." Oct. 22.

24,292.—SHAKESHAFT, C. E. M., and CLARKSON, T. J. R., "Coin-freed gas-meters." Oct. 22.

24,307-8-9.—DOWN, H. L., and TELEPHOS, LTD., "Lighting and extinguishing gas." Oct. 22.

24,317.—SMITH, J., and EXTON, J., "Portable heating apparatus for gas." Oct. 22.

24,353.—LESSING, R., "Carbonization of coal." Oct. 23.

24,367.—DARWIN, H., "Incandescent lamps." Oct. 23.

At the Somerset Quarter Sessions last Wednesday, a pedlar named Jones was indicted for obtaining money by false pretences. He had called on people in Weston-super-Mare and professed to sell Welsbach mantles, the patent for which he stated he had sold to the Welsbach Company. Two officials of the Company repudiated all knowledge of him and his mantles. Prisoner said he had been dealing with the mantles for two or three years, obtaining them from his brother at Cardiff. He did not guarantee that they were Welsbach. The brother was called, and said he supplied prisoner with mantles, which he obtained from London. Accused was sentenced to three months' imprisonment with hard labour.

CORRESPONDENCE.

[*We are not responsible for opinions expressed by Correspondents.*]

The Proposed Test-Burner Bill.

SIR,—From the proceedings at last Thursday's meeting of the Gas Companies' Protection Association, it seems that the promoters of the proposed Bill contemplate going in for the change of burner pure and simple. I am under the impression that the model testing clause prescribes also the use of the pentane standard; but, be this as it may, in two recent Acts, which I have before me, this standard is prescribed, the section reading as follows:—

> "For testing the illuminating power of the gas the burner to be used shall be that known as the 'Metropolitan' argand No. 2, the photometer shall be the bar photometer, the standard light shall be that supplied by Harcourt's ten-candle pentane lamp, and in making the test the burner shall be so used as to obtain from the gas when burned at the rate aforesaid the greatest amount of light: Provided that the Board of Trade may, on the application of the company or the local authority, approve the use of any other burner, photometer, or standard light which may appear to the Board to be equally or more suitable for the testing."

In the interests of a uniform method of testing, would it not be desirable to adopt such a clause as this? There can be no good reason for associating the pentane standard with any particular form of photometer; but the general opinion is, I believe, largely in favour of the pentane standard in combination with the bar photometer.

The "sweet reasonableness" of the Chairman's answer to Mr. W. Cash is of hopeful augury for the success of the Bill, and in refreshing contrast to the endeavour made last year to proceed under the ægis of the Board of Trade. It is likely enough that under any circumstances some amount of unreasonableness towards this proposal would have to be encountered; but it is at least equally certain that to ignore the local authorities is not the way to ensure a smooth passage for any Bill of this kind.

17, *Victoria Street, S.W., Oct.* 30, 1909. CHARLES HUNT.

[The clause quoted by Mr. Hunt is the model one, with the exception that after the words "bar photometer," the words "or the table photometer" are included as an alternative. It is therefore left to the promoters of Bills to determine which photometer they prefer. If our recollection serves us right, the parliamentary authorities originally proposed the specification of the table photometer in the model clause; but there was some contention over the question at the time that the Cheltenham Gas Company were last in Parliament, and Mr. Paterson showed that, by a very simple modification in the bar instrument, it was quite easy to adapt it for the 10-candle pentane lamp. Mr. Hunt, we believe, had something to do with putting this matter before the parliamentary authorities. With our correspondent, we also think that it would be far better, as has been done in all Gas Bills the last two or three sessions, to adopt in the Joint Bill the model cause complete, so as to get absolute uniformity. We think this course would commend itself to the parliamentary authorities who framed the model clause, and who will have something to do with the Joint Bill.—ED. J.G.L.]

Horse-Power Rating of Gas-Engines.

SIR,—Mr. J. Ferguson Bell raises a point of considerable importance to gas-power users in his letter which you published on p. 190 of your issue for Oct. 19; and we fully endorse his views.

We may add that it has been our practice for, at any rate, the last five years to carefully differentiate in our tenders between the rated power of engines as a constant working load and the maximum power when firing every cycle. If this practice were followed throughout the trade, we believe it would be a great advantage not only to purchasers of gas-engines but also to engine makers.

On the other hand, it is well to emphasize that the purchasers are themselves not without blame in most cases where the engine is too small for its work. Tenders are usually obtained from all gas-engine makers; but in the absence of properly specified particulars in the inquiry, some makers appear to be tempted to mention the maximum power only—which is the absolute maximum the engine can possibly develop when firing every cycle. If another maker offers a larger engine with a proper margin of power, his price seems high beside the quotations we have referred to; and unless the purchaser looks very carefully into these matters, as he ought to do, he is apt to settle the order on price alone, without reference to the actual respective power capacities of the several engines offered.

The principle of settling gas-engine orders upon price alone—without regard to size of engine, excellence of design, or quality of work—accounts for most gas-engine failures which we meet with in these days; and it is consequently most encouraging to us to find the subject taken up in your columns, on the lines we have long advocated, by a gentleman in Mr. Bell's position, who is able to speak quite impartially, and from actual experience of the facts.

For THE NATIONAL GAS-ENGINE CO., LTD.,
P. W. ROBSON.

Ashton-under-Lyne, Oct. 27, 1909.

Gas Appliances at the Brewers' Exhibition.

SIR,—In your report on the above in the issue of Oct. 26, I observe that the Richmond Gas Stove and Meter Company's stand was brilliantly illuminated by Messrs. J. & W. B. Smith. Will you kindly allow me to mention that the whole of the fitting-up for lighting this stand was carried out by the workmen from the Goswell Road branch of the Gaslight and Coke Company, under the supervision of the

District Inspector. The lamps used were six "Silva" indoor inverted, and three 3-light inverted pendants, with a varied selection of glass ware; the installation being designed at this branch.

Gaslight and Coke Company, E. C. Holt,
146, *Goswell Road, E.C., Oct.* 28, 1909. Inspector-in-Charge.

Connection of Washouts to Sewers.—A correspondent asks: "Have corporations or district or rural councils any power to prevent a water company from connecting washouts to sewers, after giving due notice to the corporation or council, as the case may be, of their intention to carry out the work?"

LEGAL INTELLIGENCE.

GAS-WORKS SIDINGS AND RAILWAY RATES.

RAILWAY AND CANAL COMMISSION.

(*Before Mr. Justice* A. T. Lawrence, *the Hon.* A. E. Gathorne-Hardy, *and Sir* James Woodhouse.)

Corporation of Birmingham v. Midland Railway Company. London and North-Western Railway Company, and Great Western Railway Company.

Wednesday, Oct. 27.

To-day, judgment was delivered in this case, in which the Corporation of Birmingham, who have constructed extensive private sidings at their Saltley, Nechells, Windsor Street, and Swan Village Gas-Works, asked for an order declaring them entitled to an allowance or rebate on charges made by the Midland, London and North-Western, and Great Western Railway Companies on inward and outward traffic to their various works. They also asked for a declaration that the London and North-Western Company had exceeded their maximum charge for the use of trucks. Further, they claimed damages in respect of the past six years' overcharges. The hearing took place as long ago as last March; and the arguments and evidence were reported at considerable length in Vol. CVI. of the "Journal," pp. 105, 167, 240, 316, and 390.

Mr. Justice Lawrence's Judgment.

Justice Lawrence said: In this case, the Corporation of Birmingham claim against the three Railway Companies, who have been made defendants, relief in respect of a number of matters in relation to traffic to and from their several gas-works. The Railway Companies, either in their amended pleadings or at the trial, have admitted a right to some relief in respect of some of these matters, and the parties have by their Counsel undertaken to endeavour to agree orders as to these. Orders may be drawn up in accordance with any such agreement. There must be liberty to apply in case there should be a difference between them on any point. The substantial question in the case remaining for our decision is whether the Corporation are entitled to private siding allowances or rebates under section 4 of the Railway and Canal Traffic Act of 1894. The Corporation have claimed these allowances or rebates, the Railway Companies have refused them; and thereupon disputes have arisen, and this Court has jurisdiction to entertain and determine the disputes. The gas undertaking of the Corporation is of great magnitude. It supplies with gas an area of 114 square miles, having a population of 850,000 persons. For its several works, it requires an inward traffic by rail of 650,000 tons per annum; and it sends out 120,000 tons per annum. Four of its works are involved in this inquiry—namely, Saltley, Nechells, Windsor Street, and Swan Village. Each works has its private sidings communicating with the adjacent railway or railways. Saltley, Nechells, and Windsor Street are in the heart of Birmingham. The two former are within one mile of the Lawley Street Railway Station. Saltley is served by the Midland Railway only, Nechells by the Midland Railway and the London and North-Western Railway, Windsor Street by the London and North-Western Railway, and Swan Village by the Great Western Railway. Coal, which forms the principal inward traffic, is obtained from collieries in Derbyshire, Nottinghamshire, Yorkshire, and Staffordshire. It leaves the colliery and arrives outside Birmingham in full train loads. As a general rule, three to four trains arrive per day. I will deal first with Saltley. These works cover a considerable area, and have rails laid down to enable the trucks to be taken about to the various places where coal, &c., may be needed at the moment. It is admitted that no station terminal could properly be charged in respect of the traffic to or from these works. The applicants contend that the Railway Company do not perform any service entitling them to remuneration under section 5 of the Rates and Charges Order, and that the rate charged does in fact include a sum of 3d. per ton for station accommodation and terminal services. The Railway Company deny both these allegations, and, further, say that the whole rate charged is less than the authorized maximum rate for conveyance only. This last proposition appears to be true in fact. They say, next, "We have disintegrated the rate, appropriating a penny to services 'at or in connection with your sidings,' and the balance for conveyance." This they contend is a very low charge, and about two-thirds of what they might charge for conveyance alone. The main question of fact in dispute has been: Do the Railway Company perform any service in respect of this traffic beyond what they are bound to do as carriers conveying it from one private siding to another? If they do, they would be entitled to charge a reasonable sum in respect thereof under section 5, sub-section 1. The Railway Company have large sidings outside Birmingham, at Washwood Heath, which serve as a sort of service reservoir, from which trucks can be led to the works as and when required. In these Washwood Heath sidings, the Railway Company divide mixed trains and make up trains for destinations beyond Birmingham. They also send on trucks destined for Lawley Street Station. The applicants seize upon this fact, and urge that this is all the Railway Company do for their traffic. Mr. Balfour Browne argued that the service at Washwood Heath was the same for the Corporation as for the trader to Lawley Street. This is plausible, and at first sight seems true; but it is not. The nature of the two cases is different. The trader could receive his traffic at Lawley Street. He is ready and willing to do so. It is entirely a matter for the Railway Company if their traffic is so large that it requires more siding accommodation than they have at Lawley Street. Whether his traffic uses both the Washwood Heath sidings and the Lawley Street sidings or the Lawley Street sidings only, the trader is liable for the terminal charges at Lawley Street. The Corporation, on the other hand, from the extent of their traffic and the nature of their siding accommodation, cannot receive their traffic as it arrives. It must be accommodated with, and fed from, sidings placed somewhere. In 1896, this was done from Lawley Street, Duddesdon sidings. Now it is done from Washwood Heath, and from a railway siding outside the Saltley works. Two of the sidings at Washwood Heath are set apart for the reception of Corporation traffic. From these, it is sent down, if for Saltley, to the siding outside the works. From this siding, the railway servants feed the works with coal day and night, as and when required by the servants of the Corporation. The siding is used almost exclusively for the Corporation traffic to the Saltley works. The case of the Nechells works differs only in that the siding which corresponds with the one just referred to is changed from time to time; and a short neck on which the trucks are finally placed, as and when required by the servants of the Corporation, is not on the Corporation's land, but upon the Railway Company's land. These differences are unimportant. The neck is very short; but it will hold as many trucks as can pass into the works at one time, owing to the gradients and the construction of the Corporation's sidings within the works. It was contended for the Corporation that these operations or services were all within the duty of the Railway Company as part of conveyance, on the ground that conveyance was not completed until the truck was tendered over the points of the works sidings. For the Railway Company, it was said that it was a service done at the request, and for the convenience, of the Corporation within the meaning of section 5 of the Railway Rates and Charges Order, for which a reasonable sum could be charged. There was no evidence of any express request to reserve these sidings for the use of the Corporation; and it was urged that the Railway Company did so for their own convenience. It was further said that at Saltley the Corporation could receive the coal into the works in full train-loads. This is one of those statements it is difficult to deal with. It is not false; for, under certain circumstances, and with ample pre-arrangement, it is probably true that a single train-load could be received, but it would be a feat disarranging the ordinary conduct of the works. I am satisfied it could not be done continuously as a practical business matter while the gas-works were being worked. In my judgment, Saltley and *a fortiori* Nechells need for their practical working the use of sidings of the Railway Companies as what I have called service reservoirs. It is of the first importance, not merely to the convenience and comfort, but to the safety, of the community at Birmingham that their supply of light should be assured and uninterrupted. This would be placed in imminent danger if a service of full train-loads only were provided by the Railway Companies. It is the having such works and such volumes of traffic which has determined the mode of dealing with this traffic, and has imposed these services upon the railways. In my opinion, these facts constitute a request as clear as the most formal letter. Mr. Balfour Browne argued that it could not be so, because the Corporation could not give notice in writing that they did not require the service. I do not agree. I think they could give such notice; but they would require to first clear a large tract of land adjoining their works whereon to put sidings similar in dimensions to those they now use belonging to the Railway Company. The truth is that in these questions there must be a certain breadth of treatment on both sides. Conveyance properly so-called does not terminate until the siding points are reached. There are many occasions on which a truck must go into sidings *en route*, for the convenience of the Railway Company in the management of their traffic; but it does not follow from these general propositions that all use of all sidings before the private siding points are reached is part of conveyance. I do not believe any general statement can be formulated decisive of the matter in every case. It must be a question of fact in each case whether the service rendered is incident to conveyance or is due to request express or implied of the freighter. In this case, I am clearly of opinion that there is a service not incident to conveyance, but which is due to the position, the configuration, and the area of the works, together with their internal requirements and the volume of traffic in and out which has to be dealt with. This Court had a similar question before it in 1896 with regard to these works; and it came to a like conclusion. It is true the sidings used were not at that time at Washwood Heath, but at or near Lawley Street; but this is not an essential difference, and I am sure that Mr. Barber, if he had been in the service of the Corporation at that time, would have felt this. The truth is this complaint has resulted from the Railway Companies treating Mr. Barber unfairly in another matter; and, being naturally incensed thereby, he has been led to take an erroneous view upon the question now before us. I need not deal at length with the case of the London and North-Western Railway at Nechells or Windsor Street; for no rebate is claimed in respect of coal. It is claimed only in respect of miscellaneous inward traffic. This traffic is small in amount; and though I am satisfied that some services are performed by the Railway Company in respect of it of the same nature as those I have dealt with above, I think these services are slight. The trucks arrive a few at a time; and the greater part of the shunting done is required in order to put the trucks off the train into the sidings from which the Corporation engines take them. Upon the whole, I do not think the 1d. charged can be justified for these siding services; and having regard to the fact that the Railway Company have reduced the rates upon coal—the larger traffic—I think they might well for the future allow this 1d. as a rebate upon this inward miscellaneous traffic. The same policy of competition may, one would think, be extended to it. If the Railway Company will not accept this suggestion, there must be a reference to the Registrar to ascertain what the rebate or allowance

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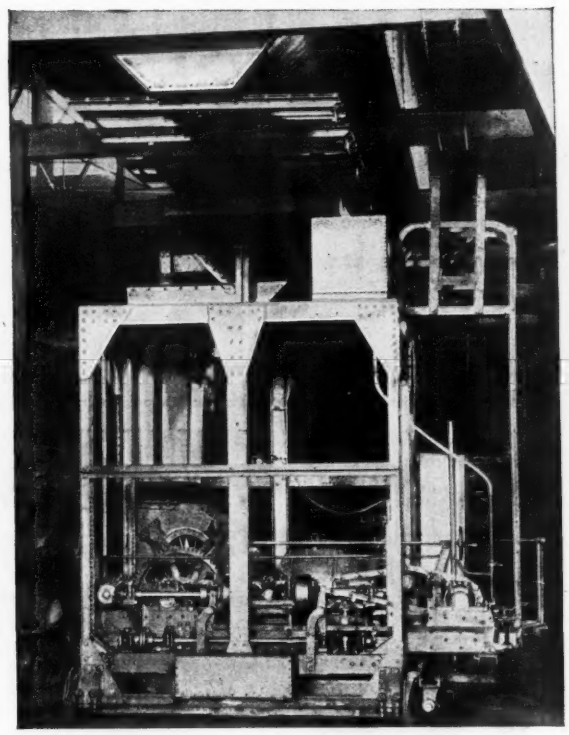

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See "JOURNAL," Aug. 3, 1909, Page 309.

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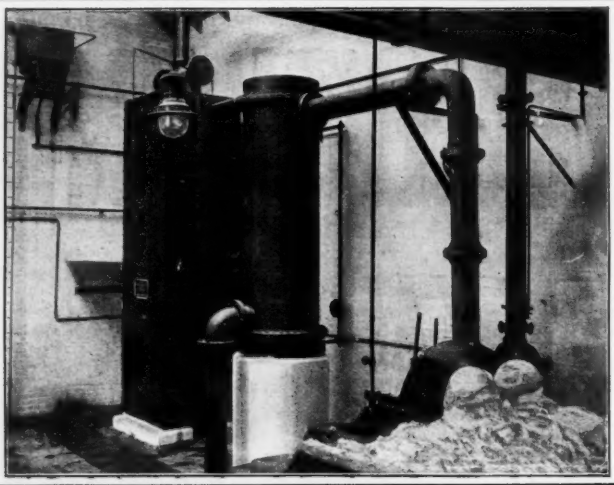

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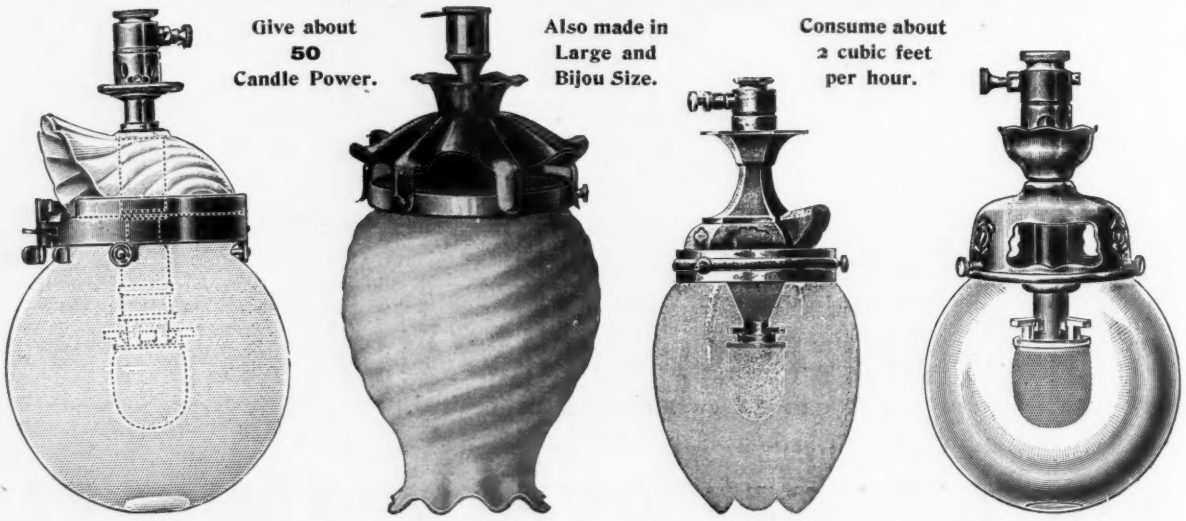

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should be. The applicants further make a claim to a rebate or allowance in respect to their outward traffic. The services rendered by the Railway Companies in respect of the outward traffic differ from those in respect of the inward traffic. The outward traffic consists of empties, coke, and the bye-products of the gas-works. These are placed by the Corporation servants upon their own sidings in whatever order the trucks happen to be ready. They are consigned to different destinations lying in different directions. Before the trucks can be attached to the train which is to convey them, they must be removed to sidings of the Railway Company, where they can be sorted ready for conveyance. It is urged that this is part of the duty of conveyance. I do not think that it is. If conveyance alone be considered, it is the duty of the freighter to tender his traffic upon his siding in a condition reasonably fit for conveyance. If he tenders a dozen trucks intended for, and consigned to, some different destinations, he knows that they cannot be conveyed to their destinations without a preliminary operation involving labour and accommodation before each starts upon its real journey. This has been called sorting in this case. It seems to me to be a service in connection with the Corporation sidings. It is quite distinct from conveyance and from the marshalling of the train which does in fact convey. This marshalling is putting the trucks which compose a train in such order that the train can most conveniently convey them towards, or to, their destination. It is a thing done for the convenience of the Railway Company. But it is the duty of the consignor to tender his traffic in such a way that the railway engine can come and take it away. If he places the twelve trucks as above mentioned, and asks to have them taken away together, he knows he is asking to have a service performed which, if he had the necessary accommodation and did the necessary work, he could do for himself. He knows that many of the trucks would have to stand upon his works for hours after others had gone, because trains do not run to every destination at the same moment. This sorting is work done for the applicants, and is done by their request made when they tender trucks mixed up in such an order as to make it impossible to convey them to their several destinations without doing it. These observations apply to the outward traffic at all four works. There is no question of law involved in this case. A great many cases were cited to us; but they do not determine the question before us, which is one of fact—namely, Is a service rendered by the Railway Companies to the Corporation in connection with their sidings, and at their request, express or implied? I am of opinion that, as a fact, there is such service so rendered. I have not dealt in detail with the case of Swan Village—either inward or outward traffic. The services in this case differ considerably in detail from those with which I have dealt above. They do not differ in principle. In each case a service is rendered for the applicants; and in each case it is necessary, in consequence of the nature and position of the private sidings with relation to the railway. The remaining question is whether the 1d., as attributed by the Railway Company, or the 3d., as alleged by the applicants, is the charge made for these siding services. I think that there is no sufficient evidence to induce one to find that 3d. is the amount charged for these services. The case of the one truck of coal sent from King's Heath Station to Lawley Street Station upon which 3d. was charged, does not convince me. No coal traffic passes between these points; and this, therefore, is not any really comparable rate. It is admitted that 3d. is the terminal for other commodities in the same class; and a clerk making out a bill for such an unusual consignment as a truck of coal from King's Heath to Lawley Street would, unless he was a very cautious individual, be sure to attribute to it a rate that would cover the ordinary terminals. In the absence, then, of any evidence of the rate upon a comparable traffic, and in view of the fact that the whole charge made is much less than the authorized rate for conveyance only, I think one must accept the Railway Company's evidence that 1d. is the amount charged for the accommodation and services afforded to coal into Lawley Street Station, and that the same sum is charged for the services above mentioned at the private sidings I have named. I see nothing to induce one to believe that the rate charged to the Corporation contains more than 1d. for these services with which I have been dealing above. As to the reasonableness of this sum, I think it is clearly a reasonable sum to charge with respect to the services which I have mentioned. For these reasons, I think that, upon this question of rebate or allowance, our judgment should be in favour of the defendants. There is a further question as to truck hire in respect of distances not exceeding 20 miles. The Railway Company seek, where the journey is partly over the line of another Railway Company, to charge 6d.—treating section 9 of the Rates and Charges Order as limiting their power of charging upon their own line only. I see no ground for this construction. The section is perfectly general in its terms; and no argument was addressed to us showing why it should not receive a literal construction. I think 4½d. is the proper charge. Another point raises the question of what amount should be charged as the rate for bricks, &c., from Congreave sidings to the Saltley works. I have come to the conclusion that the figure mentioned by Sir James Woodhouse in his judgment would be a fair rate.

The Hon. A. E. GATHORNE-HARDY: I agree with the judgment just delivered, to which I have nothing to add.

Sir James Woodhouse's Judgment.

Sir JAMES WOODHOUSE, in the course of an extended judgment which was in agreement with that already delivered by Mr. Justice Lawrence, said that the case was one of great importance and some difficulty; and it had been considerably complicated by the fact that they had had to hear at one and the same time what were practically three separate and independent applications affecting three different Railway Companies and four sets of works. After carefully considering the detailed evidence as to the capacity of the storage accommodation at the Saltley works, he was satisfied, as a matter of everyday working, that it was not sufficient to enable the applicants to receive the traffic as the Railway Company could deliver it. Mr. Balfour Browne, for the applicants, admitted that the Railway Company might be entitled to some payment in respect of the special siding close to the works on the Railway Company's property. Some additional accommodation, for example, at Washwood Heath was required to facilitate the necessary operations; and this accommodation the defendants provided, and in connection therewith performed services which, in his judgment, were extraneous and supplementary to the duty of conveyance. But it was said that the services for which a charge could be made under section 5 must be of such a nature that the party charged could give notice that he would not continue them, and further that in this case these services were not performed at the request of the applicants, and were not for their convenience, but for the convenience of the Railway Company. He disagreed with this contention. No evidence of any express request had been given; but the necessities of the traffic and all the facts and circumstances connected with its operation implied such request to enable the defendants to fulfil the obligations of their contract. He agreed entirely with the learned Judge that the determination of whether a particular service was or was not an incident of conveyance, was one of fact depending on the circumstances of each individual case; and he was of opinion that the provision of standing room and the operations consequent on the restricted accommodation in the applicants' works did involve extra service for which the defendants were entitled to some payment. As to the inward coal traffic to the Nechells works, the Midland Railway Company contended that, owing to the curve and upward gradient on the connecting line between the Company's siding and the gas-works, it would not be possible, to whatever length the Company's siding might be extended, for the applicants to receive into the works more than fifteen waggons at a time. This view was, in his opinion, borne out by the evidence; and he therefore saw no reason to differentiate the value of the services in the case of Nechells from those at Saltley. In addition to the inward traffic here, the applicants had also considerable outward traffic, in respect of which they made similar claims for rebates and allowances. If the waggons were already sorted in the gas-works, so that the defendants need incur no greater expense than was involved in attaching their engine and drawing them out of the works, no extra payment would be due. Owing, however, partly to the lack of the necessary accommodation within the works, and to the construction of the sidings, and to the proper working of the running lines, it was not possible to draw the waggons out of the sidings and unite them to the trains, without doing previously considerable operations elsewhere. These extra services involved some additional hauling as well as the provision of standing accommodation; and for this he thought the Company were entitled to some payment. He agreed with the lucid argument of Mr. Simon, that the Railway Company were entitled to have the waggon or waggons tendered to them at the point of delivery in a condition to become part of one of their trains; and this being the duty of the freighter, he must pay for the service which the Railway Company performed for him. The Corporation next contended that the real terminal to Lawley Street was not 1d., as stated by the defendants, but 3d. They founded this contention upon the fact, first, that the terminal on coke to Lawley Street was admittedly 3d., and that the station accommodation and services were the same with respect to coke and coal; and, secondly, that all articles in Class A were charged a terminal of 3d., and both coal and coke were in this class. Evidence was given of a truck of coal having been sent from a local station to Lawley Street, from which it was clear that 3d. was charged as the terminal at Lawley Street. These rates, however, were purely local rates, and were not comparable with the rates for the long-distance coal traffic which went to the gas-works. He did not think they could, against the express testimony of the Railway Company to the contrary, infer from these local rates, in which there was probably a station terminal, but which were much nearer the maximum than the long-distance coal rates, a terminal charge of 3d. in the coal rate to Lawley Street. An alternative contention was put forward during the hearing that the charge should be reckoned as 2d., by applying the principle of Pidcock's case; but the rule in Pidcock's case was not one of general application, and did not seem to him to be applicable to the facts of this particular case. He was of opinion, therefore, that the defendants had established that they performed substantial services at, or in connection with, their sidings; that they were equivalent to the services performed at Lawley Street; and that the sum charged was a reasonable one. Then the Corporation complained of a charge of 1s. 6d. per ton made by the Midland Company for conveyance of coke by that Company jointly with the Great Western Company from Saltley sidings to Small Heath. The Company admitted that this charge could not be justified, and reduced it to 1s. 3d., which included 1d. for services at Saltley sidings; but on the ground that there were no such services, the applicants asked the Court to further reduce the charge to 1s. 2d. For the reasons he had already given, he thought the defendants were entitled to extra payment for services at these sidings; and therefore the maximum rate should not exceed 1s. 3d. In the application against the London and North-Western Company, the defendants admitted that charges for cartage had been included in several instances, and promised the Court that any errors of this kind should be adjusted, and proper allowance made for any overcharges that might be found. It did not therefore appear necessary to make any order in the matter. There was also a complaint against this Company similar to that against the Midland Company of excessive charges for the conveyance of coke outwards from the Nechells and Windsor Street works. In their answer, the Company denied the alleged overcharges; and by a disintegration of the rates made on Nov. 6, 1907, after charging the maximum for conveyance and 3d. for terminal services at the receiving end, they attributed the balance of the rate they were charging to services at Windsor Street Station and the gas sidings respectively. This artificial method of distributing the rate produced the curious result that the charge for the services at the forwarding end varied in a long table of instances from 1¾d. to 8¾d. per ton, though such services were practically in every case the same. The defendants, shortly before the hearing, put in a new and revised list of coke rates, showing considerable reductions on the former rates; but the conveyance rate in one or two instances appeared to be still above the maximum. In this list of revised rates 1d. per ton, instead of the varying sums just mentioned, was uniformly charged for services at, or in connection with, the gas-works sidings. The applicants disputed these services; but he saw no reason to differentiate the case against this Company from that against the Midland in this respect. The services were similar, and substantial; and he thought 1d. was a reasonable sum to allow. There was a further complaint that the London and North-Western Company charged the Corporation 6d. per ton for the use of trucks for the conveyance of coal

and coke for distances not exceeding 20 miles, in contravention of section 9 of the Company's Rates and Charges Order Confirmation Act, 1891, which provided for a charge not exceeding 4½d. per ton for such distance. The Company said the 6d. had only been charged when the journey was partly over their own system and partly over that of other companies; and their contention apparently was that they could charge the 4½d. for the distance under 20 miles on their own system, and such additional sum as the other companies were empowered to charge for the use of trucks over their system. He failed to see any ground for upholding this view; and therefore the applicants were entitled to the order they asked for. Against the Great Western Railway, the Corporation complained of the coal rates inwards and the coke rates outwards at Swan Village. Here extra payment was claimed for shunting and sorting coke trucks, and also for necessary haulage to West Bromwich and back, a distance of 2 miles. Some service was rendered for which payment should be made; and he thought that the charge of 1d. was a reasonable sum to allow. A new list of coke rates with reductions had been issued recently; and the Company admitted the applicants' claim to repayment of certain overcharges, the amount of which could be easily ascertained and agreed. The next matter in dispute had reference to an alleged overcharge by the Great Western Company with respect to the rate for the conveyance of bricks and retort materials between the Congreave sidings and the Saltley Gas-Works. The rate charged was 3s. 2d.; but two years after the filing of the application, it was reduced to 2s. 6d. The Corporation asked that it should be further lowered to 2s. 0½d., which they contended was the maximum charge for the mileage distance. The amount now in dispute turned upon the proper allowance to be made for services at the Congreave end and Saltley respectively. The Company had claimed sums varying from 1d. to 3d. for haulage and services at Congreave, and 3d. for the Saltley sidings. The applicants denied that anything was due for these services. He thought there were special services rendered at the Congreave siding as well as at Saltley, and that a fair inclusive rate to fix for this traffic would be 2s. 3d., instead of 2s. 6d. The Corporation were entitled to an order and declaration accordingly.

Sir ALFRED CRIPPS (for the defendants): I think on all substantial matters the applicants have failed; but the order will have to be drawn up carefully, and I ask that we have leave to apply.

Justice LAWRENCE: Yes.

Mr. M'CARDIE (for the Corporation): Certain admissions, if I remember rightly, were made by the Railway Companies in the course of the case. They are scattered through the evidence; and perhaps we could look into the matter and communicate with the Railway Companies what we think has been admitted, and then bring it all, if necessary, before your Lordship.

Justice LAWRENCE: Yes; certainly. At the hearing, it was understood that the learned Counsel on both sides would agree all these matters and submit them, if necessary, for an order to be drawn up in accordance with their agreement. If they cannot agree, of course we must deal with the matter.

Sir ALFRED CRIPPS: I do not think there is any reason to suppose they will not agree.

THE WELSBACH COMPANY'S TRADE MARK.

Clerkenwell Police Court.—Saturday, Oct. 30.

(*Before Mr.* BROS.)

To-day his Worship resumed the hearing of the summons taken out by the Wolfram (Tungsten) Metal Filament Lamps, Limited, against the Welsbach Incandescent Gaslight Company, Limited, for having sold goods to which, as they alleged, a false trade description had been applied. The initial proceedings were reported in the "JOURNAL" last week (p. 265).

Mr. RUFUS ISAACS, K.C., M.P., Mr. H. A. COLEFAX, and Mr. ERNEST LUNGE appeared for the prosecution; Mr. A. H. BODKIN and Mr. WALTER represented the defendants.

Frederick Hale, Assistant-Manager of the General Electric Company, Limited, produced a copy of the "Daily Telegraph" of Sept. 23, containing an advertisement of Welsbach electric lamps issued apparently by the defendants. On September 29, in compliance with instructions received from Mr. J. Y. Fletcher, the Manager of the electric light department of his Company, he went to the premises of the defendants in Gray's Inn Road, and asked a young lady attendant in the show-room to let him see a lamp as advertised in the daily papers. She showed him some samples, and he asked if they were Baron von Welsbach's lamps. She replied that they were. He ordered two, and went down into the warehouse to receive them. As they were being handed to him he asked: "Are these Baron von Welsbach's lamps?" and the salesman said "Yes." The lamps he bought were similar to the one produced.

The lamp was handed up to the Magistrate, who remarked it had "Made in Germany" and "Welsbach" and "Aur" upon it.

Continuing, witness said he again went to the defendant's premises on the 8th of October, and asked for some more lamps similar to the samples he had previously taken away. He inquired of the attendant in the warehouse if he could assure him that they were Baron von Welsbach's lamps, as the person who required them had made a special point of this. The attendant said they were. Witness replied: "Will you kindly put it on the invoice, to enable me to show my customer?" The man did so. The principal manufacturers of lamps made from this filament were the Auer Company of Berlin.

Cross-examined by Mr. WALTER, witness said that when he went to the defendants' premises he gave the name of Holloway, Bath Road, Hounslow, and produced a trade card with this name upon it. This card was given to him by Mr. Fletcher. He did not know whether or not there was such a person as Mr. Holloway. At the trade counter he did not say he was a member of the trade; he simply asked for the lamps he had ordered in the show-room. His instructions from Mr. Fletcher were to purchase the lamps, to ask if they were Baron von Welsbach's, and to get something in writing to this effect. The only metal filament lamps his Company sold at the present time were Osrams, which he believed were made under Baron von Welsbach's process; but he did not know. The only metal filament lamps the Company had sold since he had been in the department (two years and a half) had been Osrams. He was not aware that the Auer Company were under contract not to use the words "Auer" or "Welsbach" in the United Kingdom. The only mention he had seen of the Company had been in private correspondence with his Company. He did not know that the trade-mark "Aur" was put on all goods sold by the Welsbach Company; nor did he know that "Aur" was their registered trade mark in this country.

The further hearing was adjourned for a week.

HIGH-PRESSURE WATER FOR A FIRE-HYDRANT.

HIGH COURT OF JUSTICE—KING'S BENCH DIVISION.

Friday, Oct. 29.

(*Before Justices* DARLING *and* BUCKNILL.)

Metropolitan Water Board v. Mulholland.

This was an appeal from the decision of his Honour Judge Woodfall, at the Westminster County Court, who decided that the defendant was bound to pay one guinea for water supplied at high pressure to a fire-hydrant at the King's Theatre, Hammersmith. The proceedings in the Lower Court were reported in the "JOURNAL" for April 27 last (p. 239).

Mr. DRUCQUER, who appeared for the appellant, explained that at one time water was supplied under contract, which had been determined by notice given by the Water Board; and the defendant contended that he was only bound to pay for water actually supplied. The London County Council would not allow theatres to be opened unless hydrants were fixed; and the Board were willing to afford a supply by meter. The Council, however, would not allow a meter to be used, as it interfered with the pressure. He submitted that the Board's Charges Act of 1907, which created a uniform charge throughout London, put an end to all agreements, without any notice; and where no agreement existed, the Board could sue for water supplied. Defendant was willing to pay for water; but he objected to pay for fire-hydrants.

Justice DARLING: If you make an agreement, the Board will charge you one guinea as before.

Mr. DRUCQUER: We may have to make an agreement; but we want the Court to say what is a reasonable charge.

Justice DARLING: How can we say what is a reasonable charge?

Mr. DRUCQUER: Your Lordships may not have to do so to-day; but if you hold that the agreement is at an end, the Board must take whatever steps they please to recover the rate.

Justice DARLING: I understand the Board say, "If you use water we must make a charge; and our charge is a guinea per hydrant.

Mr. DRUCQUER pointed out that this was a test case, at the instance of various theatre managers, to obtain a decision as to what was a reasonable charge.

Mr. A. B. SHAW, who represented the Water Board, said the only point for decision was whether the contract had gone. Section 6 of the Charges Act did not abolish or repeal contracts, but merely repealed certain powers of charge and substituted others.

Justice DARLING said the appeal was against the decision of the County Court Judge with reference to a contract or agreement dated Nov. 4, 1902. The plaintiffs sued upon this agreement, and the defendant contended that it had been put an end to by notice. He (his Lordship) was of opinion that the notice referred to another agreement altogether; and therefore it was not necessary to go into the question of what was the effect of notice upon the agreement. It had been argued that the agreement was put an end to by section 6 of the Charges Act; but he was of opinion that the effect of this section, and indeed of the whole Statute, was not to put an end to the agreement. Even if the Statute had done this, which it had not, he thought the agreement was preserved by reason of section 35 of the Charges Act, which expressly provided that nothing in the Act should interfere with the operation of any agreement made under the Act of 1902. The agreement in question was in terms preserved by the Act; and, consequently, there being a good basis for the claim, the appeal must be dismissed, with costs.

Justice BUCKNILL concurred.

Leave to appeal was granted, provided notice was given within one month.

LIABILITY FOR WATER SUPPLIED TO A FLAT.

In the King's Bench Division of the High Court of Justice last Thursday, Justices Darling and Bucknill had before them the case of *Metropolitan Water Board v. Cannon*. It was an appeal from a decision given by his Honour Judge Woodfall, in the Westminster County Court, on the 22nd of April last, that the defendant was liable for two quarters' water-rate in respect of a flat at Cranworth Gardens, Brixton. The proceedings in the Lower Court were reported in the "JOURNAL" for the 27th of April (p. 239). Mr. Giveen, who appeared for the appellant, said there was an agreement by his client with Mr. Owers, the agent for the owner of the flats, that the water-rate should be included in the rent; and that if the Water Board preferred to claim the rent from the actual tenant, they were bound, under the Water Companies (Regulation of Powers) Act, 1887, known as Forrest Fulton's Act, to give notice to the tenants which enabled him to deduct the amount of the rate from the rent due or accruing. This was not done. Mr. A. B. Shaw, for the respondent, urged that the Act cited had nothing to do with the case. It only applied, if the tenement was above the value of £10, where there was an agreement between the water company and the owner. In the present case there was originally an agreement, but it was determined by the Water Board by

notice given in December, 1907, that after April 1, 1908, they would only supply water on certain terms, which were appended to the notice. The agreement being thus determined, the Board were simply exercising the powers given to them by the Water-Works Clauses Act, 1847, which enabled them to sue either the owner or the occupier. Mr. Giveen read the judgment of Judge Woodfall, and pointed out that he had decided that the case did come within Forrest Fulton's Act. He urged, further, that the notice given by the Board was irregular; that it could not affect the quarter beginning March 25, the payment for which was due before the notice took effect; and that it did not determine the agreement between the Board and the owner, but only gave notice that the terms of supply would be revised. After some discussion, Mr. Justice Darling said the judgment was very unsatisfactory. There must be a new trial, and all the points raised properly dealt with.

In re Mid-Oxfordshire Gaslight and Coke Company.

In the Chancery Division of the High Court of Justice yesterday, Mr. Justice Parker had before him the case of *Grimsley and Another v. Freeman and Another*. It was a motion which came on as a short cause. The plaintiff, represented by Mr. Crossman, was the holder of 59 debentures in the Company; there being a trust deed under which the money had become due. There had been no statement of claim delivered, and no evidence filed; but Mr. Church appeared for the trustee, and Mr. Galbraith for the Company, and consented to the usual order being made. His Lordship said the order would go, on the production of an affidavit stating the facts.

In re English Gas-Mantle Company, Limited.

In the Chancery Division of the High Court of Justice last Saturday, the case of *Carmichael and Co. v. English Gas-Mantle Company, Limited*, came before Mr. Justice Swinfen Eady as a short cause, as against the Company and one defendant (Mr. M'Kean) in default of defence, and as against another (Mr. Callard) on admissions in his defence. Mr. Manning, who appeared for the plaintiff, said he was the sole holder of the first mortgage debentures to the amount of £14,000, which had become immediately payable under the terms of the debenture deed, by reason of the Company having, on the 3rd of July last, passed an extraordinary resolution for winding-up. He also had a specific mortgage on certain freehold land at Mitcham, the property of the Company, to secure repayment of the principal and interest to become due on the debentures. The two defendants named claimed to have a charge on the property. Mr. M'Kean had not put in any defence; and Mr. Callard admitted that his claim was subject to that of the plaintiff. Counsel asked for the ordinary judgment in a debenture holders' action. Mr. Howard Wright, who appeared for the Company and for Mr. Callard, did not raise any objection to the proposed minutes of order; and his Lordship accordingly sanctioned them.

Obtaining Gas with Tokens and Clock-Wheels.

At Enfield, a few days ago, William Saunders, of Lancaster Road, Enfield, was summoned for unlawfully abstracting gas belonging to the Enfield Gas Company. Mr. Windsor, who appeared for the Company, said defendant's meter was a penny-in-the-slot one, and he had put in seven coins or tokens instead of pennies. He had been warned before on the matter. The collector stated that when he called to clear the coin-box he found seven coins. On the previous occasion eleven coins were in the meter. Defendant said he had had the meter for three years, and had been in the habit of using the coins. He only did so as a convenience, because he had not a penny at the time. He always paid up the full amount afterwards. The Chairman of the Bench said defendant ought to have known better after having been cautioned. He was putting in things that were worthless, and would have to pay 10s., or go to prison for ten days. Alexander Kuhn, of Baker Street, Enfield, was summoned for a similar offence. Mr. Windsor explained that the defendant had abstracted gas unlawfully by inserting clock-wheels in his meter in place of shillings. A collector employed by the Company said he called at the house on the 9th of September to clear the coin-box of the meter, and found three shillings in cash and four clock-wheels. By putting these wheels into the box defendant had obtained 4s. worth of gas. Witness cautioned him in April last for putting no fewer than nine wheels into the meter. The Chairman said it was a most serious case, and defendant would have to pay 40s., or be imprisoned for a month.

Liability for Reinstatement of Pavement.

At the Bow Street Police Court last Thursday, Mr. Curtis Bennett heard an adjourned summons taken out against the Metropolitan Water Board by the Westminster City Council, who sought to claim £50 0s. 11d., expenses incurred by them in reinstating and making-up the pavement in Great Stanhope Street, which had been damaged by the bursting of a water-pipe. Mr. Morton Smith appeared for the Council; Mr. Courthope Munroe represented the Board. It was stated that the pipe in question burst in January last, and as a result water ran under the wood pavement, causing a considerable amount of damage to the road some distance away. The Council carried out the repairs, and charged the cost to the Board. About four months later the Board sent a letter in which they repudiated the claim, and afterwards gave as the reason that the Local Authority ought to have given them notice to do the work themselves. His Worship held that the Board were right. He said that where the work done was not such as was necessitated by opening up the road to reach the burst pipe, the Council must give the Board notice to do the work; and failing compliance with the notice, the Council could recover a penalty of £20 for every 48 hours in default. He did not make any order, and would not allow costs.

A letter from the Gas Company was read at the last meeting of the Launceston Town Council stating that they had obtained a small reduction in the price of coal, and were prepared to make a reduction in the contract for the public lighting to the extent of 9d., 8d., and 7d. per lamp, according to the portion of the town.

MISCELLANEOUS NEWS.

GAS COMPANIES' PROTECTION ASSOCIATION.

The Twelfth Annual Meeting of the Association was held last Thursday, at the Westminster Palace Hotel, Victoria Street. The CHAIRMAN (Mr. H. E. Jones) presided. The other members of the Committee present were: Mr. Thomas Berridge (Leamington), Mr. Charles E. Botley (Hastings), Mr. George Clarry (Cardiff), Mr. Douglas H. Helps (Reading), Mr. William King (Brentford), Mr. R. O. Paterson (Cheltenham), Mr. A. G. Snelgrove (West Ham), Mr. George Andrews (Swansea), and Mr. Edward Allen (Liverpool). The following gentlemen were also present: Mr. H. W. Ashmole (Ilford), Mr. P. G. Winstanley (Wolverhampton), Mr. J. T. Jolliffe (Ipswich), Mr. Jas. Braddock (Radcliffe), Mr. W. E. Price (Hampton Court), Mr. W. N. Westlake (Exeter), Mr. F. Smallbone (Woodford), Mr. W. B. Farquhar (Ilford), Mr. T. H. Hazell (Newport, Mon.), Mr. Alfred W. Oke (Southampton), Mr. J. R. H. Jacobs (Southampton), Mr. W. A. Schultz (Ascot), Mr. Charles M. Ohren (South Suburban), Mr. C. W. Braine (Wandsworth), Mr. Arthur Valon (Westgate), Mr. W. Belton (Shrewsbury), Mr. Thomas H. Duxbury (South Shields), Mr. R. W. Edwards (Aldershot), Mr. Stanley C. Sherrard (Kingston-on-Thames), and Mr. B. R. Green (Mitcham).

GENERAL BUSINESS.

The SECRETARY (Mr. Fred. E. Cooper) read the minutes of the last annual general meeting; and they were confirmed.

It was stated that apologies for absence had been received from Mr. Frank Bush, Mr. Alderman Hart, Mr. S. Y. Shoubridge, and Mr. Thomas May.

ANNUAL REPORT AND ACCOUNTS.

The SECRETARY next read the Committee's annual report and the accounts. The former was as follows:—

The Committee submit the revenue account and balance-sheet for the year ending October, 1909, together with a report of the proceedings of the Association during that period.

It will be seen from the revenue account that the receipts for the year were £565 5s., and the expenditure was £561 14s. 5d., which leaves a credit balance on the year's working of £3 10s. 7d.

As appears by the balance-sheet, the Association's assets now amount to £1928, which is represented by £1690 16s. 2d. 2½ per cent. consolidated stock at cost price—viz., £1522 11s. (including therein £175 17s. 2d. stock purchased since the last annual general meeting of the Association); balance at bank, £398 17s.; and cash in hand, £6 14s. 5d.

The Committee continued their active opposition to the Coal Mines (Eight Hours) Bill, and members of the Committee attended meetings which were held in opposition to the Bill at the offices of the Shipping Federation on Dec. 9, 1908, and at the Cannon Street Hotel on Dec. 14, 1908; and the Secretary sent out various circulars relating to the Bill and tickets of admission to the last-mentioned meeting to the members of the Association. They also subscribed £100 to the Coal Consumers' Defence League, and obtained special contributions from some members of the Association towards the League's expenses; the total amount received (including an amount of £75 received last year) being £275 2s., which was handed over to the League. The Committee also presented a petition to the House of Lords against the Bill, praying their Lordships not to pass the Bill into law, which was signed by Mr. Jones as Chairman of the Association. The Committee regret to say that, notwithstanding the active opposition offered by themselves and others to the Bill, it eventually passed into law.

The Committee, in conjunction with the Institution of Gas Engineers, proceeded with the Bill for making the "Metropolitan" argand burner No. 2 the standard burner for testing; and on Feb. 11, 1909, a deputation, comprising the members of this Committee who were appointed a Special Committee to deal with the Bill, Mr. C. C. Carpenter, and four members of the Parliamentary Committee of the Institution of Gas Engineers, was received by Mr. Tennant, the Parliamentary Secretary of the Board of Trade.

Mr. Jones, Mr. Corbet Woodall, Mr. Glover, and Mr. Hanbury Thomas addressed Mr. Tennant on the subject of the Bill, and Mr. Carpenter produced the new burner, and explained in detail its mode of working and the necessities for its adoption. Mr. Tennant, in reply, admitted the desirability of having a uniform system for testing, but pointed out difficulties which were in the way of the Board of Trade dealing with the matter as proposed by the deputation, and concluded by promising to give the matter his careful consideration, and to report to the President of the Board of Trade thereon. The Board of Trade have not since the date of the deputation given any official intimation of their intentions with regard to the Bill; but it is understood unofficially that the Board do not see their way to taking up the Bill.

The Committee have further considered the matter, and have decided to take steps for the promotion of a Bill in the ensuing session of Parliament on lines similar to the Gas Companies (Removal of Sulphur Restrictions) Bills, authorizing the gas companies who may join in such promotion to use the new burner in substitution for that now used by such companies. The Secretary was accordingly directed to send out a circular inviting gas companies to co-operate in the promotion of the Bill, and to attend a meeting on the subject to be held on the date of, and prior to, the annual general meeting; and the Chairman will report at the annual general meeting the result of that meeting. The Committee recommend the Association to vote a sum of £200 towards the expenses of promoting the Bill.

The Committee have had under consideration the recent circular issued by the Inland Revenue authorities with reference to the future disallowance of depreciation of gas plant for income-tax purposes. They are watching the progress of events on this point; but in the meanwhile they deem it advisable to advise the members not to accept the Inland Revenue Department's proposal.

The Committee are still directing their attention to the unfair manner in which local authorities owning electrical undertakings compete with gas companies by supplying energy at less than cost price, at the cost of the rates; and they would be glad if any members could give them any information which would strengthen them in dealing with the matter.

In accordance with the suggestion made by Mr. May at the last meeting,

the Committee have had prepared a panel of members of either House of Parliament interested in gas matters. Earl Wemyss has given notice of his intention to move from his place in the House of Lords a resolution empowering the important societies and organizations connected with the professions and trades of the United Kingdom to name three peers in each Parliament to speak and act on behalf of such societies on all questions in which they are interested; and his Lordship invited this Association's support in the matter. The Committee consider that the proposal is of benefit to the gas industry, and have so informed his Lordship.

The most important matters upon which the Secretary has been consulted during the last year are as follows: Disqualification of gas shareholders as parish or district councillors. Power of gas company to lay tramroad across public road without statutory authority. Liability of consumer for damage caused to meter by fire. Liability of consumer for money stolen from meter. Questions *re* income-tax assessment. Right of gas company to write off amount for depreciation of automatic supplies. Right of Surveyor of Taxes to demand production of gas company's accounts. Depth at which gas mains should be laid in roads. Liability of gas company for damage caused by explosion. Right of share or debenture holders to inspect register of share and debenture holders of a gas company. Right of rural district council to obtain Provisional Order for supplying gas and of gas company to supply such council with gas in bulk. Procedure of opposition to Bill by a gas company. Exemption from distress of fittings let out on hire. Right of a railway company to supply gas in a district already supplied by a gas company. Right of a corporation to supply electricity outside its limits of supply. Application of section 3 of the Gas-Works Clauses Act, 1871, to statutory companies authorized previous to the passing of the Act. Rating of gas-works. Right of a councillor, being a shareholder in a gas company, to vote on matters of public lighting. Right of consumer to demand special discount from company in certain cases. Necessity of stamping letters of allotment. Registration of letters of administration by administratrix. Responsibility of secretary as to stamp duty on transfers. Restrictions regarding laying of electric mains near gas-mains. Right of gas company to lay mains on private property abutting upon public thoroughfare. Allowance by income-tax authorities for wear and tear of plant and machinery. Right of local authority to require a gas company to submit plans of buildings to be erected. Company's right to refuse supply of gas to a consumer whose supply has been discontinued by reason of non-payment of outstanding account. Registration of shares transmitted by death of a shareholder in a gas company. Necessity of gas company to fill vacancy on board caused by the death of a director. Right of a gas company owning land on one side of a road to construct a viaduct over such road with consent of owner of land on opposite side. Right of a gas company to stop supply of gas to consumer who disputes accuracy of meter. Procedure of gas company in case of difference respecting tests of meters. Purchase of gas undertakings by local authorities. Stamp duty payable by a gas company on re-incorporation.

The number of members of the Association is now 110, of whom five joined during the last year.

The Committee record with much regret the death of Mr. Thornton Andrews, who was one of the founders of the Association, and was a member of the Committee from its inception up to the time of his death. In accordance with No. 9 of the Association's rules, the Committee appointed Mr. George Andrews a member of the Committee in place of Mr. Thornton Andrews.

The following gentlemen retire from the Committee in accordance with Rule 9: Mr. Edward Allen (Liverpool United Gas Company), Mr. George Andrews (Swansea Gaslight Company), Mr. Charles E. Botley (Hastings and St. Leonards Gas Company), Mr. George Clarry (Cardiff Gaslight and Coke Company), Mr. Douglas H. Helps (Reading Gas Company), Mr. R. O. Paterson (Cheltenham Gaslight and Coke Company), all of whom offer themselves for re-election. There is also a vacancy on the Committee in consequence of the resignation of Mr. E. W. H. Eady, who, owing to ill-health, has severed his connection with the Southampton Gaslight and Coke Company.

The Secretary has received from Mr. R. O. Paterson and Mr. C. E. Botley notice of their intention to propose Mr. Thomas May (Richmond Gas Company), and from Mr. Thomas Berridge similar notice to propose Mr. William Belton (Shrewsbury Gaslight Company), as members of the Committee.

The Late Mr. Thornton Andrews.

The Chairman said they had heard the report and accounts read; and at the outset of his remarks thereon, he would like to express what they would all feel—regret at the loss of their founder member, Mr. Thornton Andrews. He was sure they would wish conveyed to his family the sympathy they felt with them in the bereavement they had suffered. The Committee had made some effort to fill up this vacancy by the appointment of his son, Mr. George Andrews, whom he (the Chairman) was glad to welcome to the meeting. His father was a life-long friend of his (Mr. Jones's); and from what they all knew of Mr. George Andrews, they would feel convinced that the Association had been very much strengthened by his accession to the Committee.

The Accounts.

Dealing with the accounts, he said it might be thought that the expenditure appeared somewhat heavy, because there were two large exceptional items of £100 each in connection with the Miners' Eight Hours Bill. They supported the Coal Consumers' Defence League with a subscription of £100, the payment of which was very much advocated by the late Sir George Livesey, and the Association were also made the means of transmitting £100, the special contributions of various companies, to the League. This latter sum, of course, appeared also on the receipts side, which cleared off £100. Practically, therefore, the outlay under this head was only £100. Then there was the expenditure in connection with the preparation of the Standard Burner Bill, which explained the amount of £62 under "Law and Parliamentary Charges," and no doubt helped to swell the petty cash item as well. They would all, he thought, agree that the chief charge—£262 10s., or 250 guineas, for the Secretary's salary, use of offices, clerical staff, &c.—was money well spent in an institution of this sort, which kept them well informed on all points that needed attention. He felt that there was no need of apology for the existence of the Association, in view of the records of past years. Before leaving the accounts, he would suggest that, there being a balance of £405, they might authorize the Committee to invest another £150 or £175 in the coming year. As would be seen from the report, the Committee desired authority to devote £200 to the prosecution of the Burner Bill; but this would still permit of the investment of some such sum as he had named.

The Mines Eight Hours Act.

He had just said that they need not apologize for the existence of the Association. This would be admitted, if they considered the record of the Removal of Sulphur Restrictions Bills three or four sessions ago, and the steps they had been taking all along to try and prevent the passing of the Miners Eight-Hours Bill. This latter measure, now it was law, appeared to have given as little satisfaction to the miners as to anybody else. (Hear, hear.) Disputes, it would be noticed, were continually taking place. It passed one's comprehension why it should have been thought necessary to limit in this way the hours of a body of men who already had two holidays a week, and who were so strongly combined in their Trade Unions that they could be depended upon to get for themselves anything they wanted.

Deputation on the Burner Bill.

The report dealt with the deputation to the Board of Trade on the Burner Bill. It was quite clear that they had called upon the Board to do a little more than they could do without at the same time bringing in a further measure for the rectification of the Gas-Works Clauses Act, which probably might not have suited the members. There were departmental difficulties. Mr. Tennant explained to him after the meeting that it would be quite an unusual course for the Department, unless they acted on some line of general public interest. This movement having resulted in nothing—for the Board of Trade had not since communicated with the Association—their active friend Mr. Botley had been very energetic in putting before them proposals for the promotion of a Bill themselves; and as such a measure would be quite innocuous, and could not hurt anybody, while bringing all those who joined in its promotion to a common basis, the Committee had started the Bill. As it was always somewhat difficult to be sure of support—especially in the case of the smaller companies—the Committee asked the members to authorize them to themselves spend £200 towards the possible expenses of the measure.

The Association's Proposed Bill.

With reference to the Bill which it was proposed that the Association should promote, he might mention that they had had a most satisfactory response to the circular they had issued suggesting that each company joining should pay (in addition to the Association's £200) a sum of £50, and a further amount based upon their annual make of gas. In some quarters, however, objection was raised by small companies to the fixed contribution of £50; and the Committee had now modified this, and made the standing charge £21. As a very considerable number of important companies had come in, it was quite clear that there would be a large amount of manufacture on which to make the subsequent *pro ratâ* charge; and therefore the £21 would be sufficient for the purpose. A response had been made by between twenty-five and thirty companies. They had actually had definite promises from some sixteen; and two more had come in since the meeting which was held earlier in the day.* This made a total of eighteen; and there was a group of seven companies controlled by one gentleman which would in every probability all come in directly the fixed sum to be contributed was reduced. Therefore the Committee calculated that they had twenty-five. From what had been heard from others in the room, he had little doubt that the alteration with regard to the preliminary expenses would bring in many more. Every step was being taken to ensure the greatest possible amount of support; and he hoped the number of companies might be increased to forty or fifty. A Committee had been appointed, and an early meeting had been arranged to consider the Bill before it was deposited; so that no time was being lost.

Depreciation and Income-Tax.

There were several matters in the public mind at the present moment with regard to gas supply which the Committee had been keeping their eyes upon, apart from the Miners' Bill and the test burner. Questions had arisen in various parts of the country as to the Inland Revenue authorities refusing to allow depreciation of gas plant for income-tax purposes. In this connection the Committee had had the advantage of the assistance of Mr. W. Cash (of the Bournemouth Gas and Water Company, and also a member of the firm of Messrs. Cash, Stone, and Co.), who was highly competent to deal with this question; and he had given them the result of his own experience of the difficulties that were being raised. He (Mr. Jones) himself had a great contest at Margate with the income-tax collector who claimed arrears, to a very considerable sum, for many years, which claim he afterwards abandoned. It was, however, most discouraging to find that one comparatively small company on the South Coast appeared to have jeopardized their dividend for a time by paying on claims which he thought they would have been better advised if they had resisted. It was a great pity that they did give way, because it was like blooding a foxhound. The whole question turned on how far they could anticipate the renewal of their things by setting aside depreciation funds. The view of the Department was that they should not set aside funds, but actually charge year by year what would fall in that year, except gasholders and large things which they usually spread over several years. But apart from spreading over, depreciation had been recognized in the past, and would, he thought, continue to be recognized. Gasholders, it was true, would only fall in about every forty years; but when they did fall in, it often represented a third of the value of a small undertaking. The Committee would keep the members advised of any move in this matter; but he would urge them to resist these charges, and have them fully examined. If this were an Association with larger funds at disposal, he would go the length of saying that they should test the question for the members; but he was afraid they could not fight it without money. The testing of these questions was more or less a matter of private interest, as they touched the largest gas companies more than the smaller ones. The largest gas companies' transactions were in hundreds of thousands of pounds; and they could not afford to accept a principle which might ultimately very seriously interfere with their financial position. They should all keep their eyes on what happened in connection with the larger concerns, and themselves refuse to give way to a pressure which, as they all knew, even in a private capacity, was being made more and more unpleasant.

Electrical Competition.

Another matter to which he wanted to refer was electrical competition. There was a Bill in existence now—it had not yet passed through

* A report of the proceedings at this meeting will be found on the next page.—Ed. J.G.L.

Parliament, and it probably would not pass until next year—giving facilities to electric lighting undertakings. At some stage during the passage of this Bill, he hoped they would have an opportunity of presenting evidence to Parliament so as to point out the hardships which arose where (as they knew took place constantly) an electricity supply was actually given to manufacturers and others at a price below the prime cost; the difference being made up from the rates. This was done largely by the districts in and around London, and the larger towns in the kingdom, by municipal authorities; and the matter had only to be brought well to the knowledge of Parliament, he was sure, to be stopped. It was one of the greatest hardships the gas industry suffered, that they should actually be rated to assist their competitor.

GAS-WORKS WATER SUPPLIES.

There was another matter not mentioned in the report, but which they would have noticed in the Technical Press. This was the question of the supply of water to gas-works in London, a case in regard to which had been fought by the South Suburban Gas Company. They claimed that gas-works were entitled to a supply of water on trade terms for drinking, cooking, lavatories, &c. The law had now been declared to be (and he thought it was understandable) that a gas company needed two supplies—one for slaking coke, washing gas, and feeding boilers; and another supply on a smaller scale for cooking, lavatories, drinking, &c., which must be paid for at the ordinary domestic rate. This would mean, not that they were to pay the rate upon the value of the mains, large buildings, and gasholders, but upon those buildings alone in which special apparatus for using the water was fixed—like the offices for the rental department, the latrines, and the baths of the stokers. He did not think they need be very fearful of anything that would come to them from that. He was, however, rather surprised that the Judge did not animadvert upon the system on which the Water Board strove to charge the Company. They desired to levy a rate on a percentage of the value of the works and the pipes in the streets.

CONCLUSION.

The Secretary had recited in the report the enormous number of useful points that he had to give hints and advice upon. A great many of the matters were such as probably most of them would hardly expect to find asked about. The record indicated the very useful services that were rendered by the Secretary and the Association generally to the smaller members; and he was glad that it should be so. He concluded by moving the adoption of the report and accounts.

Mr. W. BELTON (Shrewsbury) seconded the motion; and it was unanimously carried.

RE-ELECTIONS AND ELECTIONS.

The CHAIRMAN said the next business was the re-election of the members of the Committee who retired by rotation [see report of the Committee]. He should advise those present to re-elect these gentlemen *en bloc*. Nothing could possibly exceed the zeal and attention that were paid to the affairs of the Association by them.

Mr. J. T. JOLLIFFE (Ipswich) seconded the motion; and it was carried unanimously.

The CHAIRMAN said there was only one vacancy now on the Committee. Mr. C. E. Botley and Mr. R. O. Paterson had nominated Mr. T. May, of Richmond; and Mr. T. Berridge, and Mr. George Clarry had nominated Mr. W. Belton.

Mr. PATERSON (Cheltenham) said he rose with a little feeling of regret. At the last meeting, he proposed that Mr. Belton should be elected to the Committee; but it was found that it was not a propitious occasion. That day he was going to pass Mr. Belton; and he knew he would excuse him if he (Mr. Paterson) proposed Mr. May, with the hope that on the next occasion Mr. Belton would obtain a seat on the Committee. He proposed Mr. May now on account of his near residence to London; and while there was work in the next session of Parliament in anticipation, he thought it was exceedingly necessary to have a few more of the members on the Committee who were resident in the neighbourhood of London. Another thing was that Mr. May was not only Manager but Secretary of his Company; and on this account he thought the nomination a good one. He therefore proposed the appointment of Mr. May.

Mr. C. E. BOTLEY (Hastings) seconded the motion, remarking that he was sorry there were not two vacancies. He would like to see Mr. Belton on the Committee. He remembered that both Mr. May and Mr. Belton retired last year because there was someone else who they thought would be of great help to the Association.

Mr. T. BERRIDGE (Leamington) moved that Mr. Belton be elected. He was also sorry that there were not two vacancies, because all that Mr. Paterson had said about Mr. May applied to Mr. Belton. He was a Secretary as well as a Manager, and he had ample time to devote to the duties of a member of the Committee of the Association.

Mr. E. ALLEN (Liverpool), in the absence of Mr. Clarry, seconded the motion.

Mr. GEORGE ANDREWS (Swansea) remarked that he had not quite so much time to devote to the duties of a Committeeman; and he should be glad to withdraw in favour of Mr. Belton, if the meeting would consent.

The CHAIRMAN said the action became the son of his old friend Mr. Thornton Andrews; but he hoped at a future time Mr. Andrews would favour them by his presence again on the Committee as a member.

Thereupon both Mr. May and Mr. Belton were elected.

Proposed by Mr. W. A. SCHULTZ (Ascot), seconded by Mr. W. BELTON, Mr. S. Y. Shoubridge was re-appointed Auditor for the ensuing year.

On the proposition of Mr. BERRIDGE, seconded by Mr. SNELGROVE, a hearty vote of thanks was passed to the Chairman for his conduct in the chair.

The Chairman (Mr. J. A. Doran, J.P.) suggested to the Belfast Gas Committee that they should appoint an inspector to visit the houses of gas consumers to see whether cookers and heaters were being properly used. Consideration of the matter was, however, adjourned for the time being.

"METROPOLITAN" No. 2 TEST BURNER.

Intended Promotion of a Joint Bill.

Previous to the Annual General Meeting of the Gas Companies' Protection Association at the Westminster Palace Hotel last Thursday (the proceedings at which will be found reported on p. 333 of this number), there was a meeting of representatives of companies interested in a Bill which the Association proposed should be promoted to authorize the substitution of the "Metropolitan" argand burner No. 2 in place of the burners now used by the undertakings joining in such Bill. Mr. H. E. JONES, the Chairman of the Association, presided.

SUPPORT FOR THE BILL—REDUCTION OF THE FIXED CONTRIBUTION PER COMPANY.

The SECRETARY (Mr. Fred. E. Cooper), at the outset of the proceedings, said he had to report that the following Companies had definitely decided to join in the Bill: Bath, Bournemouth, Brentford, Croydon, Hampton Court, Hastings and St. Leonards, Ipswich, Liverpool, Reading, Scarborough, Shrewsbury, Swansea, Tunbridge Wells, and Wandsworth and Putney. This made fourteen. In addition, several other Companies had stated that they were willing to join if the basis of contribution were altered. In this category came Newmarket and Prescot. Then Mr. A. F. Phillips (who was, in consequence of a strike in Italy, too busy to be present at the meeting) represented a group of no less than seven companies; and he had said that, if they changed the basis of contribution, he would recommend the whole of these companies to come in, and though he would not pledge them all to do so some certainly would. The smaller companies urged that £50 was too much as a fixed contribution. Some suggested no fixed amount; while others thought the figure should be reduced. Newmarket and Prescot said that if the contribution were reduced, they would be satisfied; and Mr. Phillips remarked that if they made the fixed sum £21, and the balance *pro ratâ* with the annual output of gas, this would entirely meet his views. If the meeting decided, instead of £50, to make the fixed contribution only £21, he (the Secretary) thought they would have many more companies; and he did not anticipate that any of those who had already signified their intention of coming in on the former basis would drop out. In fact, they were principally big companies; and it would make no difference to them. In the circular which he had sent out to the members notifying the meeting, he said: "It is impossible for my Committee to say what the cost of a Bill will be, as that will depend to a very great extent upon the number of companies who join in its promotion; but I am to point out that the cost to each company will be much less than if a company promoted its own Bill or Order for a similar purpose. The basis of contribution by each company will be a fixed amount of £50, and a farther sum based upon the contributing company's annual make of gas."

The CHAIRMAN said it was a pity they did not say the contribution "was proposed to be," because it was a matter that could not be decided by the Committee of the Association. He could not see the slightest objection to reducing the fixed amount to £21. The Association were contributing £200; and they had a right to expect that every company coming in should pay some sum as a fixed amount. He agreed that £21 would be a reasonable sum.

The SECRETARY said many companies had written to ask what were the advantages of the burner; and he had dealt with these inquiries to the best of his ability. In this, Mr. Botley had been good enough to give him assistance. One or two other companies had asked that, before they joined in the Bill, they should be informed of the total amount of cost they would be put to. It was, as pointed out in the circular, impossible to give any information as to that.

The CHAIRMAN suggested that the cost of the Removal of Sulphur Restrictions Bill might be some criterion.

The SECRETARY said that Bill cost £2145; but there was only one opponent—the Newcastle Corporation.

The CHAIRMAN remarked that it was a very severe opposition. If on the present occasion they got thirty companies, the cost to each would really amount to hardly anything at all.

The SECRETARY said one undertaking had raised a question as to whether, in the event of one company being opposed by their local authority, the cost of such opposition would be defrayed by the promoters of the Bill. He explained what was done in the case of the Sulphur Bill, and added that he thought the same would be done here.

The CHAIRMAN: It is a common cause.

The SECRETARY (continuing) said another company had raised a question as to whether they should not include in the Bill a provision reducing the illuminating power. (No, no.).

The CHAIRMAN: It is much too thorny.

The SECRETARY remarked that it was necessary for any company who intended to join in the Bill to give the earliest possible notification. Otherwise they might find they came too late for their name to be included in it. The latest date was impossible to state, because it depended on the last days for the first insertion of the Parliamentary Notice. It might possibly happen that some company's district had a paper published on Monday, in which case the latest date would be Nov. 15. The Parliamentary Agent must, however, be notified a day or two before that.

The CHAIRMAN remarked that it was really in connection with these advertisements that the chief part of the expense came in.

Mr. W. BELTON (Shrewsbury) proposed that the fixed contribution be reduced to £21, the remainder to be *pro ratâ* with the contributing company's annual make of gas.

Mr. C. E. BOTLEY (Hastings) seconded, remarking that, while he thought the basis of £50 was rather high for some of the smaller companies, on the other hand it seemed to him that they could not do away with a fixed contribution of some kind.

The resolution was carried.

Mr. J. E. HALL (Prescot) said he thought he could guarantee that his Directors would join in the Bill, now that the fixed contribution had been reduced.

Mr. T. H. Hazell (Newport, Mon.) stated that his Company would also join in the promotion of the Bill.

The Chairman said that if any representative present knew of any circumstance in his particular case that might vary the course of the proceedings by raising special opposition, it would be useful to discuss it now, though he could not conceive from his knowledge of Acts of Parliament that there should be. All they were asking for was to be put on a common basis of testing, so that, whatever their illuminating power might be, it should have the same relation to other illuminating powers.

A short discussion then took place on suggestions made with regard to the Bill, in the course of which,

Mr. F. Smallbone asked whether it would not be well to include the 10-candle pentane standard.

The Chairman, in reply, indicated that there was some divergence of opinion on this point; and said it was perhaps well at this stage not to introduce anything controversial.

A Committee Appointed.

The Chairman remarked that the next thing to do was to appoint some representatives of the companies joining in the Bill to act, together with the Committee of the Association, as a Special Committee to deal with the Bill. He thought there was one gentleman who must be included, because he was the inventor of the burner, and would probably have to explain its use to the Parliamentary Committee. He referred, of course, to Mr. Charles Carpenter, the Chairman of the South Metropolitan Gas Company.

Eventually the following gentlemen were chosen to act with the Committee of the Association: Mr. W. Belton (Shrewsbury); Mr. Charles Carpenter; Mr. W. Cash (Messrs. Cash, Stone, and Co.); Mr. Andrew Dougall (Tunbridge Wells); Mr. T. H. Hazell (Newport, Mon.); Mr. J. W. Helps (Croydon); Mr. A. A. Johnston (Brentford); Mr. J. T. Jolliffe (Ipswich); Mr. A. F. Phillips; and Mr. Harold W. Woodall (Bournemouth).

The Chairman said there were here ten names, in addition to the Committee of the Association. He thought, however, that, as this was rather a hasty meeting, they might give the Committee as now constituted authority to co-opt other members whose assistance might, at any stage of the inquiry, appear likely to be of valuable service to them.

This was agreed to.

Date for the Assembling of the Committee.

The Chairman pointed out that an early date should be decided upon for the Committee to assemble, for the purpose of approving a draft of the Bill and considering any questions that might arise.

It was decided that this meeting should take place at the Westminster Palace Hotel at 1.30 next Thursday (the 4th inst.).

Local Authorities and the Bill—Object Set Forth.

Mr. W. Cash thought that, before the present meeting adjourned, it would be an advantage if the Chairman would give them his views as to the procedure to be adopted by the companies joining in the Bill in approaching the local authorities. Should they approach them at once, and explain (with the hope of avoiding opposition to the Bill when it came before Parliament) that the proposal was not so serious and terrible a one as they might otherwise think?

The Chairman said his advice would be that they should lose no time whatever in approaching their local authorities. They should do it as soon as ever the notice of the Bill was out, or even beforehand. They should explain that the present condition of things was very unsatisfactory. The preamble of the Bill which was originally drafted and submitted to the Board of Trade contained the whole argument; and he thought no reasonable member of a local authority would fail to be convinced by it. Whether they happened to be a sliding-scale or a maximum-dividend company, it could also be explained that, directly any circumstance arose which increased the profit, the gain would be shared with the consumers. The great object of the Bill was to get at the truth. When they talked to each other about illuminating power, unless in each case it was ascertained by the same burner or one like it, they were quite at sea, and were not comparing the same things at all. Many remarks were made upon the good and bad conduct of gas undertakings upon figures which had in different cases been arrived at by different methods. It might be well to reproduce the preamble of the original Bill to which he had just referred.

The object of the Bill is to prescribe a standard burner which will afford a common basis of testing for illuminating power, so that the returns everywhere in the United Kingdom would be comparable, and so that all parties dealing with gas lighting questions from the Houses of Parliament down to the consumer of gas would have a definite standard of comparison.

At present, there is no general standard or system of testing the illuminating power of gas supplied by the numerous gas undertakings of the kingdom outside the system controlling the supply of the three Metropolitan Gas Companies known as the Gaslight and Coke Company, the South Metropolitan Gas Company, and the Commercial Gas Company. The gas supplied by those Companies has been for some time past tested by means of the "Metropolitan" argand (No. 2) burner, which was adopted by the London Gas Referees.

As the Gas-Works Clauses Act, 1871, leaves the burner to be prescribed by the Special Act, it has come about that there is a very great variety in the types of burners prescribed; and much confusion and inconvenience arise from the absence of uniformity.

Before 1868, the common definition of the burner to be used in the Acts of Parliament was simply that it be a 15-hole argand burner with a 7-inch chimney.

This definition contained no dimensions beyond the height of the chimney, and clearly covered an enormous variety of proportions by way of the holes admitting gas and the central hole admitting air, and also the space between the chimney and burner also admitting air; and as these burners were originally of corrodible metal, they all soon went out of order through rust or corrosion choking the gas-orifices.

Mr. William Sugg, as he proved before the Parliamentary Committee on London Gas, 1867, got rid of this choking by the invention of the steatite non-corrodible top; and having studied the efficiency of the burners, he made the internal hole for air somewhat larger for the richer qualities of gas than for the poorer kind.

Dr. Letheby, towards 1860, experimented, in conjunction with Mr. Sugg, with a burner having 15 holes and a 7-inch chimney; but he ear-marked it as to its dimensions by the description of "The Sugg Letheby Standard Burner," which was suitable for burning gas of about 16 candles. This burner has been prescribed in a number of Special Acts.

The appointment of the Metropolitan Gas Referees by the Board of Trade under the City of London Gas Act, 1868, resulted in a distinct advance in the then knowledge of the question, and ultimately led to the adoption, after the necessary investigation, of a burner which was described as the "London" argand No. 1 burner, which was fitted according to the best knowledge of that time for burning exactly 5 feet of gas of 16¼-candle power per hour.

That burner was found to be unsuitable for the gas when it varied in quality, and was therefore abandoned by the London Gas Referees in 1906 for the burner now used by them described as the "Metropolitan" argand No. 2, and a model of which has been deposited with the Warden of the Standards.

It has been proved that, owing to the adjustability of its air supply, the last-mentioned burner gives a fair and true result for all qualities of gas of from 10 to 20 candles, which range covers (apart from cannel gas) the obligations of all gas companies, for all varieties and mixtures of various illuminating gases, and it brings the results within the requirement laid down by Parliament in 1868—namely, that the burner should be one which would obtain the greatest amount of light possible from the gas while being practicable for use by the consumer.

The object of this Bill is to enact that this last-mentioned burner shall be the standard burner for use throughout the country for testing for illuminating power under the Gas-Works Clauses Act, 1871, and that such burner shall be deemed the prescribed burner within the meaning of that Act.

The passing of this Bill would relieve the Board of Trade of much departmental work in connection with the granting of Provisional Orders under the Gas and Water-Works Facilities Act, 1870, as well as in relation to the giving of its approval of the adoption of the standard burner in lieu of that prescribed in any particular Special Act or Provisional Order.

Further, Committees sitting in Parliament on Gas Bills would be able to rely upon the returns given to them, and thus have greater confidence as to the effect of their decisions so far as the question of the test-burner is involved.

Present Use of the Burner.

Mr. D. H. Helps (Reading) said it was most desirable that as many companies as possible should join in the promotion of this Bill; and it might be that some of the smaller concerns did not realize that fifty undertakings had already been granted the use of this burner.

The Secretary: Over fifty gas companies—apart from local authorities' undertakings.

Mr. Helps (continuing) remarked that many of these undertakings were owned by municipalities; and in those towns, if any cheapening of the gas took place, the consumer might not get the benefit as he would in the case of concerns belonging to companies. It was a most important point that so many undertakings had already been granted the use of the burner.

The proceedings terminated with a vote of thanks to the Chairman for presiding—on the motion of Mr. Cash, seconded by Mr. Belton.

AFFAIRS OF TICEHURST WATER AND GAS COMPANY.

Stormy Meeting of Dissatisfied Shareholders.

The Ordinary General Meeting of this Company was held last Tuesday, at the Institute of Chartered Accountants, Moorgate Place, E.C.—Mr. W. B. Martin (the Chairman of the Company) presiding.

The meeting was convened by public advertisements which appeared on the 5th of October. But in the interval an action had been commenced on behalf of some of the debenture holders for the appointment of a receiver, and, as reported in the "Journal" last week, they were successful.

The Chairman, in submitting the report for the period from Jan. 1, 1905, to Dec. 31, 1908, expressed the regret of the Directors and himself at the delay in sending out the accounts, and pointed out that the present Board were not responsible for the whole of the period which had elapsed since the previous accounts were submitted. In 1907, the then Directors, with one exception, resigned, and the present Board were constituted. On going into the affairs of the Company, they were found to be in an extremely unsatisfactory condition; and on account of the absence of information and the manner in which the books of the Company had been kept during the previous two years, and of the delay in handing them over, a considerable time elapsed before the Directors were able to ascertain, even approximately, the position of the concern. Between Dec. 31, 1904, and Dec. 31, 1908, no regular accounts appear to have been kept; no invoices and receipts were to be found; and the income from the rentals was accounted for in such a haphazard manner that it was impossible to check it. On taking office in 1907, the present directorate devoted their attention to increasing revenue and effecting economies; and the result of their efforts, under the most adverse circumstances, had been to raise the Company's income from £2000 to £2700, and there was every prospect that the increase would continue. There had been obtained 115 new services for water and 65 for gas. With regard to the capital account, it appeared that the total amount payable under the contracts which were entered into for the acquisition of some of the works and construction of others, for equipping both works with machinery and plant, laying water and gas mains, and the construction of the pumping-station, reservoir, &c., came to £34,750. This amount, however, included all the costs of obtaining two Acts of Parliament, and also the issue of the Company's capital, and of sinking wells for obtaining a guaranteed supply of water; the quantity secured being more than sufficient for supplying the whole of the Company's district. Passing on to deal with the circular issued by one of the shareholders (Mr. C. S. Glover), to which reference was made last week, the Chairman described it as of a very unusual character, and containing a reference to a number of companies with which the Ticehurst Company had nothing whatever to do, and stating that no debenture interest had been paid since the new Board took office. This he (the Chairman) characterized as incorrect; and he asserted that since the Board's appointment in 1907 the Directors had obtained sums amounting in the aggregate to about £2700 for the purpose of discharging pressing liabilities incurred by the previous Board,

and for carrying on the works. The whole of this sum had been obtained without any security whatever other than the undertaking of the Directors to repay the money at a convenient date. In the absence of such financial assistance, the undertaking would, without question, have been in the hands of the Company's creditors some time ago. Moreover, the Secretary of the Company had written to Mr. Glover offering to meet a Committee of the shareholders. But the invitation was responded to only by Mr. Glover's solicitor and a gentleman described as Mr. Glover's book-keeper; and so the Directors decided to convene the present meeting, and place themselves and their resignations entirely in the hands of the shareholders.

Mr. GLOVER, the shareholder who had issued the circular, then addressed the meeting. He said he had come prepared with a report which, he contended, showed that the capital cost of the water and gas works was out of all proportion to their extent. The report was made by Mr. F. G. Anderson, an engineer who had been commissioned to examine the Company's properties. Mr. Glover stated that it would be necessary to spend between £600 and £800 upon the Ticehurst Gas-Works in order to put them on a profitable basis. Many improvements would have to be carried out on the Wadhurst works; and it was estimated that these alterations could not be made for less than £1000. The work done at the water-works was valued at £7930, at the Ticehurst works at £4013, and at the Wadhurst works at £3700. The report was dated the 21st of October last.

Mr. HOOPER, another shareholder, said they had been invited to hear the accounts of the Company from Jan. 1, 1905, to Dec. 31, 1908; and now, having met, they found no properly audited accounts, nor anything that could enlighten them as to where the Company stood and what had become of the shareholders' money. The Chairman had plenty to say about the enormities of Mr. Glover; but although the Directors had been in office since 1907, they could not produce for the inspection of shareholders a set of accounts signed and audited.

The CHAIRMAN interposed to say that the accounts, though not audited in the full sense of the term, had been signed.

Mr. HOOPER rejoined that there was no signature on the copy of the accounts which had been sent to him, nor had he been able to discover any shareholder who had received a signed statement. In these circumstances, he must continue to consider and to refer to the accounts as unsigned; and, according to the Chairman's own admissions, they had not been properly audited. The books and accounts were confessedly in a hopeless muddle, and the Chairman endeavoured to absolve himself and his colleagues by saying that they had not been on the directorate the whole of the period during which the accounts were permitted to get into this disgraceful condition. But the three gentlemen who now represented the Board had been among the original Directors; and so the attempted exculpation by the Chairman was a piece of barefaced audacity. All things considered, Mr. Glover's circular was neither out of place nor inaccurate. A disgraceful condition of affairs prevailed, for even the collections of revenue were not satisfactorily accounted for.

The CHAIRMAN again interposed, and denied having expressed dissatisfaction with the collection of the revenues or with the collector (Mr. A. W. Lunt), in whom the Board had every confidence.

Mr. HOOPER insisted that the absence of receipts and vouchers showed there was no absolute or accurate record of collections.

At this point, Mr. Lunt was asked to explain in detail how he dealt with collections. He stated that from day to day he paid the collections into his own private account, and at the end of each week sent on his cheque for the full amount to Mr. Preston. Asked why the cheque was sent to Mr. Preston rather than direct to the Secretary of the Company, he replied that he acted under instructions from the Chairman. On the latter being called upon to explain, he stated that Mr. Preston, who was among the original shareholders of the Company, was a creditor for upwards of £2000, for money advanced; and Mr. Lunt's cheque was sent to him as a sort of reassurance that the revenues of the Company were not diminishing. Asked what security Mr. Preston had for his loan, the Chairman replied that he held no security but the guarantee of the directorate; and he added that Mr. Preston was actuated solely by the desire of befriending the Company. This statement evoked derisive interruptions; one shareholder crying out: "All for pure love of doing good." The Chairman emphasized the fact that the cheque of the collector was made payable to the Company, and that in every case it was forwarded by Mr. Preston to the Secretary, and paid into the Company's banking account.

Mr. HOOPER continued his criticism of the action of the Board in respect to the accounts, and concluded by proposing a resolution that the report of Messrs. Archer and Capes, of Sept. 2, 1909, to the Directors and Shareholders of the Ticehurst and District Water and Gas Company, be handed over to the Receiver appointed on behalf of the debenture holders.

Mr. GLOVER seconded this motion, which, on a show of hands, was declared carried.

Mr. JERVIS, representing the debenture holders, questioned the Chairman as to an item of £8000 alleged to be owing to the Company by Mr. Eaton on a number of shares.

The CHAIRMAN replied that the money was due from Mr. Eaton; but he admitted that the Board had never taken any steps to collect it.

The remark provoked much disorder.

Mr. EATON thereupon rose and said that, notwithstanding the statement of the Chairman, he denied the debt. The shares had never been allocated to him, but were given as collateral security for money advanced to the Company; and he held a letter to that effect. He had returned the shares to the Company two years ago.

A search of the register then took place to discover if there had been any entry of the receipt of these shares; and the announcement was made that no entry could be found.

Amid a scene of some disorder, Mr. HOOPER moved that the meeting be adjourned to Tuesday, the 16th of November, at the same place, and that in the interval Messrs. Saker and Davis be employed on behalf of the shareholders to prepare a balance-sheet, and that the accounts submitted be not passed, nor the resignations of the Directors considered.

The motion was carried almost unanimously; and the proceedings, which lasted upwards of two hours, were brought to a close.

DANISH GAS COMPANY.

Transfer of the Randers Works to the Municipality—New Works at Flensburg—Investment of Reserve Moneys.

The Annual Meeting of the Company was held last Thursday, at the London Agency, Millbank House, Westminster, S.W.—Mr. CORBET WOODALL in the chair.

The LONDON AGENT (Mr. H. G. Warren) read the notice convening the meeting; and the Directors' report and accounts, already referred to in the "JOURNAL," were taken as read.

The CHAIRMAN, in moving the adoption of the report and accounts, said he thought they were, on the whole, very satisfactory. The expended capital had been increased in the year by £69,470, of which £33,618 was spent at Flensburg, in further construction of the new works; £16,000 at Aalborg and Randers upon the building of additional gasholders; £15,000 on mains and distribution plant; and the remainder was accounted for by sundry extensions at the various stations. On the other hand, the capital had been written-down by £77,244, which represented the value of the Randers undertaking as it stood in the books of the Company in April last, when it was transferred to the Municipal Council. No allowance for depreciation of the Randers property had been made in the accounts. But, as the shareholders were aware, they had a reserve and depreciation fund which was intended to cover all possible depreciation of the contracts; and from this the sum necessary to balance the Randers capital had been transferred. He might say the amount taken from the reserve and depreciation account did not equal the proportion of the amount which had been set aside on account of Randers. The capital employed by the Company (which was £838,511 at the opening of the year) was carried forward at £830,737—the reduction being the difference between the amount which had been spent in extension of the works, and the amount he had referred to as having been written off on account of Randers. Acting upon the authority given to the Directors by the shareholders a year ago, 3500 of the shares held by the Company were cancelled; and the amount of their value (£35,000) transferred to reserve and redemption account. A like number of ordinary £10 shares were issued, and realized £44,327, of which £9327 was premium. This transaction left the capital account undisturbed, except by the introduction of the premiums named. The net profit was £66,228, and was practically the same as last year; there having been an increase of £37 only. Coal and oil had cost less; and more gas was sold by 40 million cubic feet. The price charged was, however, less under the sliding-scale operating in Denmark by an average of 2d. per 1000 cubic feet; and they had spent more upon maintenance and depreciation of works and plant, and also in wages. So that the saving in coal, and the increased revenue from the additional gas sold, had been balanced by these counter-charges. The loss on exchange had been £782 less than the previous year, owing to the smaller amount remitted from Denmark to London, and to the lower rate of exchange. The fire insurance account had been increased by the addition of £1000, *plus* interest on investments £266; and it now stood at £8891. The Directors had transferred £13,000 from profit and loss to the reserve and redemption account; being £2000 more than in the preceding year. The fund had also been increased by £3469 interest on investments, and by £7000 the dividend on the investment in the shares of the Company. The total amount of the fund was now £228,882. He might say that, in future, if the contribution to this fund was to be equal to what it had been in the past year, they would have to take £3500 more from the revenue account, because, instead of receiving £7000 (to which he had referred) on the shares invested, they would receive only £3500, seeing that £35,000 had been transferred to reserve and redemption account. The balance available for dividend was £80,257, less the interim dividend, costing £18,250, and paid in March last. Out of the £62,007 remaining, it was proposed to pay a final dividend of 2½ per cent. and 5 per cent. on the preference and ordinary shares respectively, as well as a bonus of 1 per cent. on the ordinary shares. These dividends would absorb £25,250, and leave £36,737 to be carried forward. This was slightly less than last year. The dividend this year was increased by £750 by reason of the preference shares, which were issued last year, and upon which they then only paid a quarter's dividend, while this year they had to pay for the whole year. The transfer of the Company's undertaking at Randers to the Municipality took place as from April 1 last. The value was settled by two capable Arbitrators; and although the amount was somewhat less than the Board anticipated, the award was unquestionably a fair and honest one. In addition to the valuation of the works in action, the purchasers took over at cost a new gasholder and tank and certain workshops, which had just been completed. They also paid the Company compensation for the profits which would have accrued between the date of purchase and the end of the year 1914, which was the date of completion of the contract. The sum which had had to be taken from the redemption account did not exhaust the amount which had been provided for Randers. It went without saying that the Directors regretted the loss of this station, where the Company had supplied gas for 54 years. They thought it probable that they could have offered terms to the town which would have been as advantageous to the citizens as the transfer. There was, however, a strong feeling in favour of taking over the property, due possibly, to some extent, to the fact that the Municipality already owned the electric lighting works. It was a matter of satisfaction to the Directors that, in leaving the town, they were leaving behind them a good name. The relations of the Company with the Municipality throughout had been of a very friendly character. It would interest the shareholders to know that the loss of the station, measured by the number of meters in use, had been more than made up by the growth of the Company's business elsewhere within the year—that was to say, in the one year they had issued more meters than were in use in the town of Randers. At Flensburg, although the new works were nearly completed, it had been decided not to light them up this winter. The delay had arisen chiefly from the construction of a bulwark along the Fjord—a work which was being done for the Company, and not by their own officers. The Magistrates of the town had agreed to the extension by one year of

the time within which the site of the old works had to be surrendered. The Directors were pleased with the new works, which, when completed, would be well worthy of the town. The delay in transferring the manufacture from the old works would enable them to get so much more duty out of the apparatus which would eventually have to be abandoned. To this extent there would be advantage to both parties. The Company would have no difficulty in supplying from the old works during the coming winter. Of the contract with Flensburg, only five years remained unexpired, so that when they got to work in the summer of next year at the new station, there would only be five years in front of the Company within which to earn their share of the cost of the new works.

Lieut.-Col. T. H. LEWIN seconded the motion.

Mr. A. BAIRD said at the last meeting he took the opportunity of making a few remarks regarding the financial position of the Company. Before calling attention to one or two items in the present report and balance-sheet, he was sure he should be expressing the feelings of all the shareholders present when he said that they had listened with very great interest and pleasure, as they always did, to the Chairman's remarks. His information was always satisfactory, instructive, and explanatory. Looking back on the Company's history for the last few years, the shareholders could not help being struck by the large capital outlay that had taken place, involving a correspondingly large increase in the issue of ordinary and preferred shares. The issued capital now stood at £125,000 higher than it did five years ago. In addition, there was an item of £30,000 to debit of capital account, and £16,000 overdraft at the bankers—making £170,000 altogether; and this was represented by the additional amounts expended on works, &c. It was very satisfactory to note that the increase in the consumption of gas had fully responded to this large outlay, and that this now amounted to nearly 30 per cent., he thought, during the period mentioned. But there had been practically no increase in the net profits during the last four years, which was not altogether satisfactory. The profits, however, were still large enough to give a satisfactory return to the ordinary shareholders; and he hoped the low price of coal which now prevailed would tend to improve the profits this year, notwithstanding the early hours which now appeared to be kept by the Danes. What he was particularly desirous of calling attention to was that, while this large increase of capital liabilities was going on, the amount of the reserve fund investment outside the business remained almost stationary. It was true that year by year a considerable amount was placed to the credit of the reserve and redemption account (and more this year than usual); and the item under the joint heading had now reached the respectable sum of £229,000. But when one came to ask the question, "Where is all this money gone to?" one found that only £105,000 had been invested; and the larger amount of £125,000 had disappeared in the business. He had always held that, in an industrial undertaking such as this, the only sound way of treating the reserve fund was to have it available for any emergency that might arise; and the proper way to deal with depreciation was to write off year by year a percentage of the amount standing to the debit of gas-works plant, machinery, and so on. He considered it a mistake (and he said this with great respect) lumping these two items together; and he should have thought it desirable to have kept them apart. He could not, therefore, regard as satisfactory the argument the Chairman used at the last meeting, that it was better to employ a considerable portion of the reserve fund in the business, because they thereby derived a larger return from it. To his mind, the object of a reserve fund was not to earn money, but to secure safety, and to have it in a form easy to call upon if required. It was altogether misleading to describe the £229,000 as a reserve and redemption fund, when only £105,000 was available if it should ever be wanted. As he had said before, the larger portion (£125,000) was merely a book entry, and not an amount of cash available for a possible emergency. He was afraid the arguments he had used did not commend themselves to the Board—at least, they did not appeal to them before. He hoped, however, they would give them further consideration, and perhaps modify the methods which had been adopted. He should like to add that he did not make these remarks in any hostile spirit to the Company; but only in order that their finances might be placed on a more satisfactory basis.

The CHAIRMAN said he could for his colleagues, as he did wholeheartedly for himself, say that they always listened to Mr. Baird's criticism of the finances with pleasure; and their thanks were due to him for the care with which he prepared them. This was the third time, he thought, that Mr. Baird had brought forward the question of the investment of the reserves. He would promise him again that the Board would take what he had said very carefully into consideration. But he thought it would be a little unworthy on his part if he did not say that the opinion he expressed on the last occasion remained his opinion that day; and that, so far as he knew, there was no difference between the members of the Board on the question. Mr. Baird had spoken of the £125,000 which was not invested out of the amount of the reserve fund as having disappeared, and as being merely a book entry. As a matter of fact, every penny of it was invested in the works, and was earning its full proportion of profits as though capital of the Company. If the Directors were to put the £125,000 by, then they would have to call up an equal amount of capital, which would cost about 6 per cent., in order that, having called it up at 6 per cent. they might invest it at 3½ per cent. He perfectly recognized the advantage of having money ready to call upon when required; but the Board had felt they had met this amply by investing £100,000 in securities outside the Company. And at present they had no intention of increasing this amount, except in so far as it automatically increased by the addition of the interest upon it from time to time. He did not think Mr. Baird quite appreciaetd the position of the Company. The Company had terminable contracts in several towns. The result was that their calls for capital would probably be less in the future than they had been in the past. They had as an illustration this year the loss of Randers. The Directors were sorry indeed to lose this station. They could not help it; it had to go. The contract terminated in 1914; and the Municipality were particularly anxious to take possession just now. The Board came to an arrangement which was quite satisfactory between the Municipality and the Company; and the Company were given a sum which capitalized the profits that would have been earned in the years that intervened between now and when the transfer would, in the ordinary course, have taken place. What was the result of the transaction? Instead of wanting money from the reserve, they had increased the amount of the reserve by reason of the loss of Randers. Mr. Baird referred to the fact that the Company were £16,000 in debt to their bankers. This had been paid off from money received from Randers; and the amount of the investments had been increased. From 1906, the outside investments had gone up by £20,000, which was 25 per cent. on what they were in 1906. His difficulty was that he could not see the necessity for this large sum lying by. If they were a rapidly increasing Company, with new contracts to provide for, he could see it; but when they were having from time to time large sums of money coming in by reason of the termination of contracts, he must say he failed to see why they should be calling up capital in order to put it into reserve. There was nothing in the outlook in the nature of an emergency likely to call for large sums of money. As to writing-off depreciation, they were constantly doing so. The depreciations were carried out in the most liberal spirit; and they were upholding the undertaking in the best possible condition.

The motion was unanimously carried.

On the proposition of Lieut.-Col. DAVIDSON, seconded by the Hon. N. M. FARRER, the dividends mentioned in the Chairman's speech were declared.

Moved by the CHAIRMAN, and seconded by Mr. R. S. GARDINER, Mr. J. H. Birchenough, C.M.G., was re-elected a Director; and proposed by Mr. M. M. BIDDER, seconded by Mr. F. D. MARSHALL, the Auditors (Mr. Edwin Waterhouse, F.C.A., and Major E. A. Critchley) were re-appointed.

On the proposition of Mr. BAIRD, seconded by the Hon. N. M. FARRER, a hearty vote of thanks was passed to the Chairman and Directors and the officers and staffs at home and abroad.

CEARA GAS COMPANY, LIMITED.

A Satisfactory Report.

The Annual General Meeting of this Company was held last Friday, at the London Offices, No. 9, Queen Street Place, E.C.—Mr. F. A. WALLROTH in the chair.

The SECRETARY (Mr. George R. Guyatt) read the notice convening the meeting and the Auditor's certificate. The report and accounts were taken as read. The report was noticed last week, p. 272.

The CHAIRMAN said it was a pleasure for the Board to meet the shareholders and present the report and accounts, which they deemed very satisfactory. The net profit was not so much as last year, which was their record year; but with this exception, it was the largest they had had. It was £1240 less than last year; and this was entirely accounted for by the decrease in profit on products and fittings. As regarded the profit and loss account, taking it somewhat in detail, there was an increase in coals carbonized of £570, in maintenance of £754, and in salaries of £200. Bad debts were a little less. The Directors' fees were now £630, as they always used to be until the bad times of the drought, when they reduced them by £100 till these times passed away. The proprietors would remember that at the last meeting the Board thought that the time had come to revert to the old state of things. General charges were £160 more, and interest on debentures a little less. There was one holder desirous of being paid; and as the Company had the money in hand, the Directors were glad to do it—seeing that the money invested only brought in 3¼ per cent., whereas they were paying 6 per cent. on the debentures. The debentures (of which there were £10,300 outstanding) would fall due at the end of 1910; and the Company had invested in trustee securities £12,000. There might be a little depreciation on this; but it was more than covered by the interest received on the investments. The loss on exchange was not so great by nearly £1000; but this was mainly due to less having been remitted last year. Commission was a little less. On the other side, gas supplied was £700 more; but the receipts from products and fittings were £1260 less—the result being a balance of £7490, or £1240 less than last year. They had a very large stock of coke; and there had been great difficulty in disposing of it. As the shareholders knew, coke would soon deteriorate; and as the Company were unable to sell it, they had not taken any credit for this item in the accounts, which largely explained the decrease he had mentioned. He was glad to say that lately they had been successful in finding a market for some of the coke; and he hoped this would continue. Therefore, though they had taken no credit for it this year, they trusted it might come in as a profit next year. In the balance-sheet, the only items he need allude to were the stocks and goods in transit, which showed an increase of nearly £3000. This was chiefly due to the increase in the stock of coal. Last spring, they were unfortunate in having a ship lost with 500 tons of coal. They were covered by insurance, so far as the cost went; but a loss like this was very inconvenient, such a long way as they were from Brazil. There was quite enough in stock to last until a fresh ship arrived; but the Directors took the opportunity to send out an extra amount, as they thought it desirable to be in an absolutely safe position—especially as at that time there was talk of a coal strike in this country. This, he was happy to say, did not occur; but the Company had now a large stock in store, which rendered them safe against all vicissitudes. They had invested £3000 in the past year—£2000 in Water Board stock, and £1000 in paying off this amount of debentures. The result of the year's working was that the accounts showed a profit of £7490, which, with the balance brought forward, gave a total of £12,153; and after deducting the interim dividend paid last April, there remained £10,465 available for division. Of this, the Board had placed £4000 to reserve, making the fund now £16,000; and they proposed to pay the usual dividend on the preference shares and a dividend of 5 per cent. on the ordinary shares (making 8 per cent. for the year), and to carry forward a satisfactory balance of £4180. He concluded by moving the adoption of the report and accounts.

Mr. F. W. BROTHERS seconded the motion.

Mr. CHARLES WEBB asked whether the Company were on very good terms with all the inhabitants out there, and whether there was any

competitor in the shape of electricity. He took it there was an Advisory Board in Ceará, as well as the London directorate.

The CHAIRMAN replied that there was no competitor in the form of the electric light; and the Company were on excellent terms with the citizens. Of course, Mr. Gandon managed the works; but the Company had a legal adviser in Ceará as well.

Mr. WEBB: Have you reduced the price of gas?

The CHAIRMAN: It is fixed by the concession.

Mr. WEBB: But there is nothing to prevent your reducing it, if you hink proper?

The CHAIRMAN: I do not think such a course advisable.

The resolution was then carried unanimously.

On the proposition of the CHAIRMAN, seconded by Mr. T. M'MAKING, dividends of 5 per cent. on the preference shares, less income-tax, and of 5 per cent. on the ordinary shares, free of tax, were declared for the six months to June 30. This made, with the interim dividend already paid, 10 per cent. on the preference shares, and 8 per cent. on the ordinary shares, for the year.

The retiring Directors (Mr. Wallroth and Mr. Thomas Guyatt) were re-elected, on the motion of Mr. BROTHERS, seconded by Mr. F. E. LINGING; and the Auditor (Mr. A. W. Cooper) was also re-appointed, on the proposition of Mr. WEBB, seconded by Mr. T. A. GUYATT.

The CHAIRMAN proposed a vote of thanks to the Engineer (Mr. Herbert Gandon) and staff in Ceará and the Secretary. This vote, he said, was well deserved, for all had done their very best during the past year, as the balance-sheet proved.

Mr. M'MAKING seconded the resolution, and it was heartily passed.

The SECRETARY briefly acknowledged the compliment.

The proceedings were brought to a close with a cordial vote of thanks to the Chairman and Directors, which was proposed by Mr. WEBB, and seconded by Mr. T. A. GUYATT.

COLONIAL GAS ASSOCIATION, LIMITED.

Annual Report and Accounts.

At the Annual Meeting of the Colonial Gas Association, Limited, to be held to-day, the Directors will report that, after writing off £1011 for depreciation of works, there remains a profit of £7071, to which has to be added the amount brought forward from last year—viz., £943—making an available balance of £8014. Deducting from this the amount paid for debenture interest, &c., and the interim dividend paid in April, at the rate of 4 per cent. per annum, amounting altogether to £3379, there remains a balance of £4635 available for distribution, which the Directors recommend should be appropriated as follows: To pay a final dividend at the rate of 7 per cent. per annum, free of income-tax, making 5½ per cent. for the year (against 5 per cent. last year), £2967; to place £600 to the reserve fund account, increasing it to £5968; and to carry forward £1068. The accounts show that the revenue from the sale of gas was £20,795 and from residual products £2251; the total receipts amounting to £23,165, compared with £21,071 in the year 1907-8. The expenditure (including the £1011 written off for depreciation) was £16,094, against £14,789 before. The Managing-Director (Hon. George Swinburne, Assoc.M.Inst.C.E.) reports that the works, plant, and machinery have been maintained in an efficient condition; several alterations and improvements having been made. There was a further expansion in the sale of gas in the twelve months; the average increase, as compared with the previous year, having been upwards of 14 per cent. Formal notice has been received from the Geraldton Corporation of their intention to exercise their right in March next to negotiate for the purchase by arbitration of the Company's gas-works at that place, in accordance with the terms of the concession; and the Directors are taking the necessary steps for the protection of the interests of the Association.

The Recent Sale of Portsmouth Water Company's Shares.—In the paragraph on this subject which appeared in the "JOURNAL" last week (p. 271), it should have been stated that the whole of the 2000 £5 shares offered by Messrs. King and King were sold at the prices named (£6 5s. to £6 7s. 6d. each); the total amount realized being £12,522 10s.

High-Pressure Gas Lighting for Rotherham Market Hall.—The Markets Sub-Committee of Rotherham Town Council have decided in favour of the substitution of incandescent burners (worked from the high-pressure plant) in lieu of the flat-flame burners at the Market Hall, at an estimated cost of £45. The Gas Department are to light and maintain the new system at 6d. per burner per month for twelve months.

A Strange Experience at Barnsley.—Referring, in the Barnsley Town Council, to the public lighting, Mr. Jones asked whether they were getting value for the money expended. He expressed the opinion that the lighting was most inefficient and unsatisfactory, and hoped the matter would be gone into closely. Alderman Wray, on behalf of the Lighting Committee, said they were now spending £3500 per year on street lighting. If they granted all the requests for further lighting facilities, they would have the rates up to 9s. in the pound. The cost of incandescent lamps, with the mantles, &c., had been found to be prohibitive; and they considered the best way was to go on extending the electric mains.

Louth (Lincs.) Gas Company.—At the annual general meeting of this Company on Monday last week, the Directors reported a net profit of £2701, and a disposable balance of £3423. Dividends were declared of 14¾ per cent. on the original capital, 5 per cent. each on the "A" and "B" improvement stocks, and 11¼ per cent. on the new ordinary stock (1877). These payments absorbed £1996. In addition, certain mortgages are to be paid off; and there will then be left £426 to be carried forward. More gas was made and sold than in the preceding year; and as coal cost 8d. per ton less, gas was put into the holders at a cheaper rate. The return from residuals, however, was not quite so satisfactory as it had been. The average make of gas per ton of coal carbonized was higher than before; and the unaccounted-for gas was less than 5 per cent. on the make.

DUBLIN GAS COMPANY AND THE CORPORATION.

Settlement of the Dispute.

The Lighting Committee of the Dublin Corporation prepared a report to be submitted at yesterday's meeting of the Council, recommending a settlement of the legal proceedings now pending between the Corporation and the Alliance and Dublin Gas Company.

The report, after going into the history of the matters in dispute, says: The Lighting Committee are pleased to report that they have secured the consent of the Directors of the Gas Company to the following arrangement—viz., that "If the Corporation agree to the conditions, the Gas Company will allow a discount of 10 per cent. to be deducted from the gas accounts furnished monthly for public lighting, the said discount to include the added areas, and to commence from Jan. 1 next. The discount will also be allowed on the arrears due for gas for the added areas." This arrangement removes all risk of withdrawal of the discount at any time by making it independent of the rates charged to other consumers. The Company and the Committee further agreed that, if this settlement be approved by the Municipal Council, the respective actions and counterclaims shall be withdrawn, each party bearing its own costs. The Lighting Committee accordingly recommend that the settlement arrived at be approved; and that the Law Agent be instructed to prepare any consent or agreement necessary to carry out the same. The Committee further recommend that the Town Clerk and Law Agent be empowered to take all necessary steps as to the completion of such agreement or agreements as may be necessary in connection with the settlement, including the affixing of the City seal to same.

EDINBURGH AND LEITH GAS COMMISSIONERS.

New General Offices—Quality of the Gas.

Last Wednesday afternoon, a company of about sixty gentlemen in the public service in Edinburgh and Leith assembled at No. 25, Waterloo Place, Edinburgh, to inspect the new offices which have been erected there for the Edinburgh and Leith Gas Commissioners. The necessity for the reorganization and concentration of the administration of the various outdoor departments of the Commissioners had for some years been fully recognized, and several probable buildings and sites had from time to time been examined with the view of providing the accommodation necessary for the efficient and economical discharge of the multifarious duties appertaining to these departments. In nearly every case, however, the accommodation offered proved to be either insufficient in character or too expensive to acquire. The final closing of the in-town manufacturing stations, however, rendered immediate action necessary; and, in order to accomplish the object in view, steps were ultimately taken to purchase some tenement properties at Calton Hill, immediately at the back of the Waterloo Place block. These properties, which in themselves were useless for the purpose in view, were valuable so far as the ground on which they stood was concerned. They were ultimately purchased for the sum of £3958 18s. 4d., and consisted of three blocks of tenement property. The adjoining block of buildings belonging to the Prison Commissioners was negotiated for, but its purchase could not be accomplished. The office staff and those employed in the outdoor departments of the Commissioners involve an outlay for wages alone annually of £37,621, which is equal in extent to the entire wages spent for performing the whole of the operations at the manufacturing station at Granton.

The scheme consisted of three separate divisions. The first was the reconstruction of the Waterloo Place offices, which have been increased in available floor area by 36 per cent., and the lighting, ventilation, and sanitary arrangements thoroughly renovated and brought up to date. This work has primarily consisted in dispensing with useless staircases and partitions, with a slight extension of a portion of the back elevation, affording additional show-room and office accommodation. The second stage consisted of the construction of a four-floored warehouse block immediately to the back of No. 25, Waterloo Place, and communicating therewith by means of a bridge, which affords accommodation for the main and service laying, meter, and fittings departments. The ground floor is set apart for the clerical staff connected with these departments, and accommodation for setting out the materials required by the workmen on the following day. The first floor is the workshop for the repair of meters, stoves, and fittings, where mechanical appliances have been introduced for doing as much of the work as can be performed by such means. The second and third floors afford storage accommodation for all the appliances used in connection with the undertaking, so far as the outdoor departments are concerned—meters, fittings, piping, &c. The third feature was the construction of a block of offices communicating at the back with the two previous blocks for the accommodation of the staff of the Chief Engineer and General Manager (Mr. W. R. Herring, M.Inst.C.E.), and comprises four floors of commodious and conveniently arranged offices. The estimated cost of the new buildings was £15,980 10s. 4d.; and their construction has been carried out for approximately £15,000, though the final figures have not yet been made up.

After the inspection, tea was served in the coffee-room.

Lord Provost GIBSON, who presided, said the inspection had been of the greatest benefit to them, because they had seen the latest development of the gas undertaking. He thought they would give credit to Judge Bryson, the Works Committee, and Mr. Herring, who had had the arrangement of the premises. The necessity for the new offices showed the enormous expansion of the concern.

Judge BRYSON expressed pleasure at seeing the assembled company. He said the new buildings reflected the greatest credit on Mr. Herring, who was the architect of them and superintended their erection.

Bailie DOUGLAS complimented the Committee and Mr. Herring, who was, he believed, the most able man in Edinburgh. He did not agree with him in everything; but Mr. Herring was a foeman worthy of the steel of any of them. He (the speaker) was perhaps the oldest

Gas Commissioner; and he had no hesitation in saying that the Commission was carried on upon business lines, and that the community need have no fear with respect to anything supplied to them. When they had everything adjusted, particularly the burners, matters would be all right.

Mr. HERRING thanked the gentlemen who had spoken for their kind remarks. He said it was quite true that the work had been carried through by himself, but he had had considerable help from the Committee appointed to look after the matter. He had no interest to serve except that of the gas undertaking—in other words, the gas-consuming public, numbering about 100,000 householders in Edinburgh and Leith. He acknowledged, as Bailie Douglas had remarked, that adjustments were necessary. The position of matters was that they had given up using a very expensive coal—a coal which was fast being wrought-out in Scotland, and was advancing in price beyond all bounds; and they were now using what might be termed a common gas coal, of which there was abundance. They were making the best quality of gas they could from this coal; and, so far as he knew, there was no proposition to reduce the illuminating power of the gas below what it had been for the past six months. This quality was the same as was supplied all over England; and it must be admitted that English towns, in illumination, in the houses and in the streets, were reasonably well supplied. What was good enough in these towns must also be suitable for Edinburgh and Leith, so long as they gave the consumers the right kind of burner for using it. This was what they were doing. They were endeavouring to adjust the burners as fast as they could, and they were also testing some burners which Bailie Douglas had brought forward, to see whether they would give the same, or better, results; and as these burners cost only about 10s. a gross, he was quite sure it would be the Commissioners' interest to complete the inquiry they were making. The majority of the people now used incandescent burners; and the change that had taken place in the quality of the gas had not affected the light given by them. He hoped that by the time they had passed through the coming winter the transference would be accomplished. The Commissioners would then be in a position to control the lighting; and he believed that the public would be satisfied.

DEVONPORT GAS-WORKS DISPUTE.

The dispute over the management of the gas-works continued to occupy a leading position in the Devonport municipal elections until the close of the contest. Both the present and the late Chairman of the Gas Committee took part in it.

Alderman Hornbrook, the late Chairman, in one of his speeches, gave an emphatic denial to the assertion that a considerable saving had been effected as the result of the recent inquiry into the work of the Gas Committee; and he challenged Alderman Tozer, the present Chairman, to a discussion of the subject. He also said that the contract which a former Gas Committee made with Messrs. Willey and Co., respecting slot installations, was a splendid contract—better than that which the Plymouth Gas Company at the same time had with the same firm. As to the saving of £800 which the present Gas Committee claimed to have made in the conduct of the business since last November, Alderman Hornbrook said this was not due to the action of the Committee, but was the result of more favourable markets. There had been a suggestion that a Local Government Board inquiry should be held. He wished an Inspector had been sent down; for there were one or two things he could point out which would make someone "sit up."

Alderman Tozer, replying at another meeting, repeated the history of the contract with Messrs. Willey and Co., and said that the ratepayers were saved several thousands of pounds by the readjustment of the contract. It was easy for Alderman Hornbrook to say that he disputed this; but the reduced amounts paid for installations were 17 per cent. less than they paid in the first five years of the contract. It meant an average saving of 14s. per installation; and they had fixed 340 installations since July last. Beyond this, the charge of 4s. 8d. per installation for maintenance had been waived, and the amount had been saved. Alderman Tozer added that he took care not to act alone, but saw that everything of importance was done by the whole Committee.

MANAGEMENT OF THE COLWYN BAY GAS-WORKS.

In consequence of the unsatisfactory results attending the working of the gas undertaking of the Colwyn Bay Urban District Council, Messrs. Thomas Newbigging and Son were called in a few months ago to inspect the works and district and inquire generally into the management of the concern. Their report was presented early in September, and was briefly noticed in the "JOURNAL" for the 28th of that month. Copies have since been issued, with a reply by the Manager (Mr. J. W. C. Pennington), made at the request of the Council; and we give below the principal portions of each document.

Messrs. Thomas Newbigging and Son's Report.

Before dealing in detail with the points contained in the Council's letter of instruction, Messrs. Newbigging briefly record the impression their investigation has made on their minds. They say: "You have a good gas-works, well equipped and well situated, and capable of producing gas economically and of the required quality. The district of supply is a most excellent one, with paying classes of consumers, as is proved by the consumption per consumer. All that is necessary to make the undertaking a success is good administration and capable management. We are reluctantly compelled to say that these essentials have been wanting. The undertaking has drifted (we say it advisedly) into

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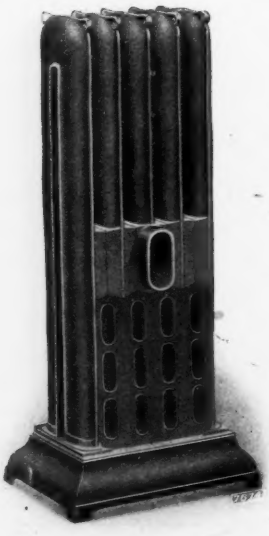

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a somewhat critical state; and only good guidance will bring it into a sound position. The Council acted wisely in acquiring the gas undertaking, and they acquired it at a reasonable price. In support of this statement, we draw attention to the figures of profit made during the first years, 1902 and 1903-4 (fifteen months) of the Council's ownership of the undertaking—viz., £486 2s. 6d. and £1947 18s. 5d. respectively. But experience was lacking in dealing with a growing gas supply in a growing district; and it would have been well had the Gas Committee occasionally obtained advice from those competent to give it. The history of the undertaking since the transfer points to the absence of a strong guiding hand—your most pressing need. Since the date of the transfer, the sum actually expended on the gas-works, including the railway siding but exclusive of the distribution plant, amounts to £282 per million cubic feet of gas sold, or much less than the amount which would have been necessary had it not been for the fact that at the time of the transfer the site and works were of a capacity in excess of the then requirements. Had this not been the case, you would have been under the necessity of spending a much larger sum per million cubic feet to provide the land, works, and siding. So far as the recent expenditure is concerned, the railway siding, on which £3280 has been spent and a small sum has still to be paid, provides for future growth; and it was a wise expenditure to incur, irrespective of the question of direct economy, as it removed some objectionable traffic from the roads. The works, however, as regards the principal plant—the retort-house, the purifiers, and the gasholders—are now working nearly up to their full capacity. Very considerable expenditure will be necessary in the works almost immediately if the growth in the consumption continues. Any scheme of extension should be carefully considered, and wise foresight exercised in its adoption."

Proceeding to deal with the working results, Messrs. Newbigging say the Council have not bought their coal to the best advantage as regards either price or quality. They note, however, that the purchases for the current year are a distinct improvement; but they say there is room for more. The make of gas last year—10,530 cubic feet per ton—compared unfavourably with the 11,244 cubic feet of 1906. They consider there is no reason why the latter figure should not again be reached and maintained. The Council have the quality of coal and the plant to do it; and it should be done. The explanation offered by the Manager for the fall in the make of gas was that the works were in an upset state owing to the construction of the siding. But Messrs. Newbigging say "this should not have affected the make. In any case, however, the siding is complete now, and there is no longer any reason for last year's figures." They also consider that there might be a reduction in the labour employed on the works.

Referring to the repairs on works, mains, and services, Messrs. Newbigging say the amount spent on repairs of works for the past year (£941) was "much too high;" while the expenditure on mains and service repairs (£66) was too low. They consider that there is no reason why the expenditure on the works should not be very materially reduced, and the works still maintained in a satisfactory state. With regard to the salaries of the officials concerned, they point out that the Manager is paid £300 a year, with house, coal, gas, and rates free, and a bonus in addition; that the Chief Clerk is paid £130 and the Assistant Clerk £97 10s. per annum; while the apportionment of the Town Clerk's, Treasurer's, and other expenses amounts to a further £100—making a total in that department of £627 10s. per annum. They recommend that the receipt of money be transferred from the gas office to the Council's collector, which would enable the Council to dispense with one clerk's services. So far as the amount apportioned to the Town Clerk, the Treasurer, the Accountant, and the collecting department is concerned, they are of opinion that this cost should be borne by the Finance Committee, and that "it is not legal to charge even an apportioned amount against the Gas Department." While they are not prepared to cavil at the remuneration paid to the Manager, though it is high for the size of the works, as they consider a good manager should be well paid, they advise the discontinuance of the bonus system on increased output, which they say "is wrong in principle in the case of a gas undertaking, and should be abolished."

After a few observations on the stationery, printing, assessment, and general charges, Messrs. Newbigging proceed to deal with the distributing plant. As regards the mains and services, a capital sum of £11,787 has been spent upon them since the undertaking was acquired. Calculated on 26½ million cubic feet of additional gas sold, this amounts to £445 per million; and the reporters consider that "only great and certain confidence in the growth of the number of gas consumers could justify such an expenditure. Would-be consumers at long distances from the mains should have been so charged as that the extension would not have entailed a loss on the undertaking." Services have been put in free of charge, at an estimated average cost of £1 15s. 6d. each. This is characterized as, under the circumstances, a "wrong concession, which should receive early consideration with a view to a change being made." On cooking-stoves, £4737 was spent; and here it is thought "there is room for great economy." Messrs. Newbigging conclude this portion of their report by expressing the opinion that "in the distributing department there has not been exercised the thought and economy so necessary if the undertaking is to be a financial success."

With regard to the question of unaccounted-for gas, Messrs. Newbigging say this has increased from 10·82 per cent. of the total gas made in 1902 to 14·17 per cent. in 1909. They add: "The percentage method of reckoning is not, however, the best way of showing the loss incurred; it is better to state the loss of gas per mile of main. The loss of gas per mile of main in 1902 amounted to 280,964 cubic feet, which has increased to 366,553 cubic feet in 1909. This is very much in excess of what it might be under careful supervision." The very high leakage is attributed by the Manager to three causes: (1) Excessive consumption of gas by the pilot-lights of street-lamps; (2) non-registration of meters where single pilot-lights are used in houses and shops; and (3) subsidence of mains and the drawing of services by sewerage operations. Commenting on these points, Messrs. Newbigging say: "The consumption of gas by the pilot-lights of street-lamps is excessive; and we recommend that these lights should be

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done away with. There is no real need for them, as, in actual practice, it is found as easy to light by torch as by pilot-light. The second cause is possible; but, from experience, it is found that where pilot-lights are used there are, generally speaking, more than one light, and consequently the gas is registered. Similar conditions as to pilot-lights prevail in other towns where the unaccounted-for gas is normal. Sewerage operations causing subsidence are a common reason given for loss of gas. Inasmuch, however, as gas, even if it escapes into a sewer, finds its way out into the open air, it is soon reported to the gas office. The offer of a small reward for notification of gas escapes might be beneficial." Messrs. Newbigging found in the course of their investigation that there was no systematic inspection of meters; and they say it is highly desirable that one should be instituted.

The last matter dealt with is the price of gas. In 1906, and again in 1907, reductions were made; and Messrs. Newbigging find it difficult to see why this was done in face of the small balance of profit in 1905, and the knowledge of the capital cost that would have to be incurred to provide for the growth that always follows even a small reduction. They say by this action the Council "courted a certain deficit," for they charged 3s. 4d. per 1000 cubic feet for gas which cost them 3s. 5·29d. Again, taking the price charged for gas supplied to the public lamps—viz., 2s. per 1000 cubic feet—the presumption is that the Gas Committee, in fixing this figure, thought it proper to charge the bare cost of the gas, without including interest and sinking fund charges. But Messrs. Newbigging point out that even without these charges the cost came to 2s. 1·08d. They say the moral to be drawn from these observations is that the Council should increase the price charged for gas until such time as they can see their way, by improved working results, to revert to the lower figure.

Messrs. Newbigging summarize as follows the chief points on which they have touched: (1) Much room for improvement in the quality and price of coal. (2) Wages too high, and a reduction possible. (3) Repairs to works too heavy, and could be reduced. (4) Production of gas per ton too low, and should be brought up considerably. (5) Capital expenditure on distribution too high as regards mains, services, and cookers. (6) Expenditure on distribution out of revenue too low; and more attention should be paid to leakages and to the testing of meters. (7) Unaccounted-for gas too high. (8) Price charged for gas to other departments of Council below cost, and should be increased. (9) Selling price of gas reduced when it should not have been. Finally, Messrs. Newbigging say the undertaking is burdened for the time being; but they have no fear for its future, "under careful administration and management."

The Manager's Reply.

With reference to Messrs. Newbigging's comments regarding the reduction in the make of gas in 1908-9 compared with 1905-6, Mr. Pennington says the difference was due to the fact that the coal used in the latter year was screened, while in the former it was unscreened. He denies that the make per ton was bad; and points out that for the past seven years his average was 10,812 cubic feet, whereas from the statistics for 69 municipal undertakings for 1907-8 it would be found that not 33 of them reached the same figure. He also points out that the Colwyn Bay gas is 17-candle power, and remarks that if the Committee will reduce the standard he could increase the make.

As to the expenditure on works and mains, the Manager says the costs were bound to be excessive last year in consequence of the alterations at the works. But now that these have been carried out the charges will be reduced. He disagrees with the reporters' views regarding the bonus system, and points out that many large corporations and companies have recently adopted it.

Coming to the question of unaccounted-for gas, Mr. Pennington says: "It will be very difficult for the Committee to understand that leakage depends on the mileage of mains and on the number and length of services and the pressure at which the gas is supplied. Owing to the distance of our distributing mains from the works, and also to the fact that in the centre of the town most of the streets are supplied by 2-inch mains, it is necessary to keep on a pressure of 35-10ths, for part of the day even 40-10ths, and never less than 20-10ths on the Rhos main; the least pressure on the two during the night being 15-10ths. Some works I know of never have more than 20-10ths pressure on the mains at any time. Our leakage per mile of main, in spite of these high pressures, is 366,552 cubic feet, or 40 cubic feet per mile per hour, which is rather less than the average figure of all works. . . . If we doubled our consumption without extending the mains, our leakage would be reduced from 14 to 7 per cent."

The Manager states that the price charged for public lighting is not sufficient; and he says that the amounts of money which have been taken out of the profit and loss account and placed to the district fund should be repaid. He adds: "If sums are taken from the gas profits in this way, it will be bound to necessitate an increase in the price of gas to make up for it."

In a concluding paragraph, Mr. Pennington remarks: "I am convinced that if we take every possible step to obtain consumers on the line of the 28 miles of main we now have, and so increase the consumption, the profits will very speedily show improvement. In our endeavours to meet the desires of the town, we have, perhaps, laid mains in too freely. . . . Expenditure has been incurred, and we have not yet reaped the benefit of it."

At the meeting of the Holborn Borough Council on Wednesday, the Works and General Purposes Committee reported that, in order that they might form an opinion as to the most suitable manner of lighting the new street from Torrington Square to Montague Place, they had given directions for several lamps to be erected on trial. The Gaslight and Coke Company had informed the Committee that they were not able to apply the high-pressure system of lighting to this street; but that, in consequence of the improvement which had been made in incandescent mantles, it would be possible to obtain as good a light with gas at ordinary pressure.

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LEEDS METER-STORES BURNT.

Late last Friday night, fire was discovered to have broken out at the Leeds Corporation gas-meter stores and stoves department in Meadow Lane. Apparently the fire broke out near the top of the building, which consisted of three floors, for in a very short space of time, the whole of the roof was blazing. During the progress of the conflagration, Mr. R. H. Townsley, the Engineer and General Manager of the Gas Department, arrived, and assisted in coping with the outbreak. In addition to the building, a quantity of meters and stoves were, of course, destroyed; but in an interview with a local reporter, Mr. Townsley said it was impossible to state what the damage would be, except that it would be some thousands of pounds—the stock not only being valuable in itself, but the building being a large and costly one. Fortunately, stocks were at the time low, as it had been intended very shortly to transfer the workshops to more commodious premises in Sovereign Street. The loss is said to be covered by insurance. During the fire, the tram service along the Beeston and Dewsbury Road routes was completely suspended; and a long line of cars speedily gathered on either side of the front of the burning building. A large and orderly crowd gathered and watched the progress of the fire, which was accelerated by numerous escapes of gas. Difficulty was experienced in coping with these escapes; and it was decided to reach the service-pipe from the main lying beneath the pavement. While this was being done, the escaping gas continued to blaze at various points of the building. The retort-houses are situated some distance away from the scene of the fire, and were never in any jeopardy from the burning building.

GAS v. ELECTRICITY FOR HEATING AND COOKING.

A recent issue of the "Pall Mall Gazette" contained the first of a series of articles on "The Art of Heating and Cooking." In the course of it, the writer made the following remarks on gas and electricity.

Gas now plays an important part in any scheme of heating; and the highest medical and scientific authorities assure us that, given a properly-fitted stove with adequate ventilation, gas heating is quite as satisfactory from the hygienic aspect as the older methods. It is certainly true that too little attention is paid to this question of ventilation; and cases are not infrequent—especially in offices and in the halls of private buildings—where no ventilation whatsoever is provided. What would be the effect of a coal-fire under similar conditions, assuming, of course, that the smoke could be disposed of? Gas as an adjunct to, if not entirely a substitute for, heating by coal-fires, is indispensable in the modern house. For living-rooms no doubt many people still prefer open coal or wood fires for their more companionable, and, one may almost say, more romantic, attributes. For reception-rooms only occasionally used, for billiard-rooms, dining-rooms, studies, and last, but by no means least, for bedrooms, however, there is nothing better than a gas-fire. It is cleanly, readily lighted, quick in its heating effects, and may be turned off at any desired moment. In a house with many bedrooms but a comparatively small staff of servants, or in one where the one maid is a true maid-of-all-work (and no play), coal-fires in the bedrooms are prohibitive; and it is here that the gas-fire scores every time. No one who has experienced the difference between a coal-fire and a gas-fire while lying ill in bed would ever willingly be without a gas-fire in the bedroom. Electricity has been adopted to a limited extent for heating; but its undoubtedly high cost, and the fact that it affords none of the ventilating advantages attending the use of coal, wood, or gas fires, are bound to restrict the use of current for heating within a small limit.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

At the monthly meeting of the Edinburgh and Leith Gas Commissioners on Monday, the Engineer reported a make of gas during September of 141,529,000 cubic feet—an increase over the same month of last year of 9,592,000 feet. The increase in the make since May 15 has amounted to 23,882,000 cubic feet. As this was the last occasion on which Lord Provost Gibson would preside at a meeting of the Commissioners, Provost Smith, of Leith, in eulogistic terms, expressed his own and the Commissioners' appreciation of his Lordship's services to the Commission during the past three years. The Lord Provost, in returning thanks, said he had the privilege of being a member of the Commission, as a representative of the Corporation, before the appointment of Mr. Herring, their Engineer, and the acquisition of the Granton property and erection of the extensive works there. It was a Trust in which he was exceedingly interested; and he gained some very valuable experience in the development of it under these conditions. He thought the Commissioners could quite well take credit for the far-seeing policy which they initiated, because they knew, as a Commission, that the result financially had been of the most economical nature. A pleasing thing to them was that, notwithstanding the wonderful development and keen competition of the Electrical Departments of the Corporations of both Edinburgh and Leith, the business of the Gas Commission had gone on increasing, with the enormous advantages of the new works and under the care and admirable administration of Mr. Herring. He would leave the Commission with a considerable feeling of regret.

Next day, Lord Provost Gibson bade farewell to the Town Council of Edinburgh. In the course of a valedictory address dealing with the work of the Council since he entered it seventeen years ago, he said that the purchase completed of the ground at Granton for the erection of the new gas-works cost £812,000 for ground and buildings. The net result of the scheme had been the provision of land for all reasonable

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future requirements, the construction of new and modern works far removed from the centres of habitation, and a cheaper price for gas than would have been possible under the old conditions of working. Financially, the scheme had resulted in an increase of the gross profits from £38,000 in 1896 to £112,000 in 1909, with commercial conditions as to price of coal rather against the undertaking, rates of wages higher, and a lower price for gas.

The inspection of the extended and new offices of the Edinburgh and Leith Gas Commission on Wednesday may be regarded as marking the period of the closing of the capital account of the Commission. The concentration of their manufacturing works at Granton, and the resultant abandonment of the works in Edinburgh, Leith, and Portobello, led necessarily to a concentration of office work. It has been evident for years that the old office in Waterloo Place was altogether inadequate for the accommodation of the staff, and that additional accommodation would require to be provided. This has been done. Everything administrative is now to all intents and purposes under one roof, and so is the show-room and the stores of fittings. Mr. Herring has, since his arrival in Scotland, revolutionized the manufacturing department of the Edinburgh and Leith Gas Commission, and concentrated the administrative department. It does not seem as if there were much else for him to accomplish; but his tireless energy will doubtless find some outlet yet, which will be for the benefit of his adopted compatriots.

In the Edinburgh Town Council on Tuesday, the recommendation of the Cleaning and Lighting Committee that the offer of the Gas Commission to take control of the stair lighting of the city, referred to in last week's "Notes," came up for consideration. Approval of the recommendation was moved by Mr. Lyon, the Convener of the Committee and a Gas Commissioner, and was seconded by Treasurer Harrison. Councillor Leishman, who was one of the leading opponents of the Provisional Order obtained by the Gas Commission in 1908, moved for delay. He would like to know if the Electric Lighting Committee had examined the question of the lighting of stairs, and the possibility in that direction. It was a serious matter that the Corporation should hand over the common stairs, some 12,000 in number, to the Gas Commission, in which case electric lighting would have very little chance of ever getting there at all. Mr. Herring had said that he would supply gas for lighting purposes at 2s. 4d. per 1000 cubic feet. He was told that it cost 3s. per 1000 cubic feet to manufacture gas, and so the Commission were going to sell gas at under cost price. He asked for delay in order that the whole position might be examined from the point of view of the electric light undertaking, and from their own point of view. The recommendation of the Committee was approved by 27 votes to 16. For the purpose of avoiding a delay of about six weeks in obtaining a final reading of the minutes of the Town Council, Mr. Lyon moved that the Standing Orders be suspended, and that the work be proceeded with at once. This was agreed to by 35 votes to 10. Subsequently notice of motion was given of a remit to the Cleaning and Lighting Committee to consider the advisability of introducing electric light into stairs of high tenements in central parts of the city.

The Eastern District of the Scottish Junior Gas Association, as noticed elsewhere, paid a visit to the works of the Pumpherston Oil Company, Limited, this afternoon.

Recently the Gas Committee of the Glasgow Corporation received a letter from the County Council for the Lower Ward of Lanarkshire, stating that at a meeting of the inhabitants of Muirhead and Chryston it had been resolved to apply for a supply of gas to that district; also that it be formed into a lighting area, and that a supply of gas be given for street-lamps. The Gas Committee agreed that the price to be charged, both to private consumers and for public lamps, should be the same as in the Milngavie district—namely, 1s. per 1000 cubic feet above the city rate. At a meeting of the Gas Committee yesterday, a letter was read from the County Council stating that they will hold a meeting on Monday; and it is expected that they will then give their sanction to the formation of a lighting area. Mr. A. Wilson, the Gas Engineer, was authorized by the Committee to proceed with the work as soon as the requisite permission is given by the County Council.

The Cowdenbeath Gas Company, having obtained the lighting of the village of Crossgates, this week held an exhibition of gas appliances in the Public Hall. The goods on view were cookers and heaters of Messrs. John Wright and Co., Limited, and lighting appliances of Messrs. Falk, Stadelmann, and Co., Limited. At the opening ceremony on Tuesday evening, Mr. F. Hutton, of Edinburgh, the Chairman of the Cowdenbeath Gas Company, said that his Company had had their eye on Crossgates for years; and he did not think that Crossgates need regret having a supply of gas from them. Gas would be supplied at a much cheaper rate than if gas-works had been erected in the village itself. The exhibition was declared open by the Rev. John Clarke. Mrs. Middleton gave lectures and cooking demonstrations daily.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *Oct.* 30.

Sulphate of Ammonia.

October requirements all being filled, the tone has been dull the whole of the week, and some decline in values has to be recorded. The closing quotations are £11 2s. 6d. per ton f.o.b. Hull, £11 3s. 9d. per ton f.o.b. Liverpool, and £11 5s. per ton f.o.b. Leith, while the tendency is towards still lower prices. Encouraged no doubt by the weakness of the spot market, dealers have been more bold in offering forward delivery, and business is reported as having been done well into next year at practically to-day's figure. Makers, however, are still asking a premium for the more distant months.

Nitrate of Soda.

This article is slow of sale, but quotations are maintained at 9s. 3d. per cwt. for 95 per cent. quality, and 9s. 6d. for refined, on spot.

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Tar Products.

LONDON, *Nov.* 1.

Markets for tar products have been quiet throughout the past week. Pitch has been easy, and a fair amount of business is reported on the east coast at 26s.; but it is doubtful whether makers could secure this price for any considerable quantity, though manufacturers are still practically out of the market. On the west coast, makers appear to be fairly well sold. Creosote is quiet. London oil is said to have been sold at 2⅜d., though it is believed that this was for one of the smaller makes. In the Midlands, manufacturers seem to be fairly easy in their position; and in the North, there are reports that business has been done at very low figures. Benzol is steady. London makers appear to be decidedly short of this article; but in the North, business continues to be done at 5⅜d., delivery to the end of the year. Fifty-ninety per cent. benzol is quiet, but chiefly owing to the fact that there is very little obtainable as there is a fair demand for it. Toluol is steady, and in the North there appear still to be buyers. Solvent naphtha is firm. London makes in particular are scarce, and are commanding good figures. Carbolic acid is quiet, and Continental consumers decline to offer more than 10½d. for 60's on the east coast; but English consumers seem to be paying better prices than this. Refined naphthalene is dull, though there is no alteration in price. Salts are in fair demand.

The average values during the week were: Tar, 13s. to 17s., *ex* works. Pitch, London, 26s. to 26s. 3d.; east coast, 25s. 6d. to 26s.; west coast, 24s. 6d. to 25s. 6d. f.a.s. Mersey ports, 25s. f.o.b. others. Benzol, 90 per cent., casks included, London, 6⅛d. to 6⅜d.; North, 5⅝d. to 6d.; 50-90 per cent., casks included, London, 7⅛d.; North, 6⅜d. to 7d. Toluol, casks included, London, 9d. to 9½d.; North, 9d. Crude naphtha, in bulk, London, 3⅝d. to 3¾d.; North, 3⅜d. to 3⅝d.; solvent naphtha, casks included, London, 1s. to 1s. ¼d.; North, 11¼d. to 11½d.; heavy naphtha, casks included, London, 10½d. to 11¼d.; North, 10d. to 10¼d. Creosote, in bulk, London, 2½d. to 2⅝d.; North, 2d. to 2¼d. Heavy oils, in bulk, 2⅜d. Carbolic acid, 60 per cent., casks included, east coast, 10½d. to 10⅝d.; west coast, 10½d. to 11d. Refined naphthalene, £4 10s. to £8 10s.; salts, 37s. 6d. to 40s., packages included and f.o.b. Anthracene, "A" quality, 1½d. to 1¾d. per unit, packages included and delivered.

Sulphate of Ammonia.

The market has been quiet during the past week, and it closed decidedly easier. In London, the principal Gas Companies still quote £11 7s. 6d. for prompt and £11 10s. for forward, but cannot obtain these figures; and outside makes can be secured on Beckton terms at £10 18s. 9d. to £11, while f.a.s. London terms are little better than these. In Hull, one of the best makes has been sold at £11 5s.; and outside makes are certainly not worth more than £11 to £11 2s. 6d. In Liverpool, the value is £11 2s. 6d. to £11 3s. 9d.; and in Leith, makers are asking £11 5s. to £11 6s. 3d., but cannot secure these prices. For prompt delivery, they are quoting £11 10s.

COAL TRADE REPORTS.

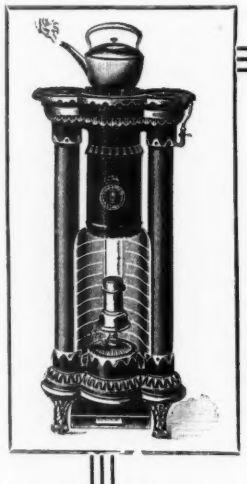
Northern Coal Trade.

There is still the weakness in the steam coal trade which is not unusual at this season of the year, when the Baltic demand is decreasing. Best Northumbrian steams are about 10s. 3d. per ton f.o.b., second-class steams are 9s., and steam smalls from 5s. to 6s. The demand is fair for this season; but shipment has been in a few cases interfered with by the stormy weather, and this has had its effect on prices. On the other hand, gas coals have naturally a heavier sale, both for home use and for export; and the deliveries are approaching the period of fullest use. Durham gas coals vary from 10s. 3d. to 11s. per ton f.o.b., according to quality, for the usual classes; while for "Wear specials" the quotation is up to 11s. 9d. Among the heavy contracts that are reported are some for best gas coals—for about 200,000 tons. These sales have been made to merchants; and the price agreed upon is said to work out at nearly 11s. 3d. per ton f.o.b. A contract for the supply of coal for Königsberg is also named—some 60,000 tons of fair Durham gas coal, which is said to be at 14s. per ton, delivered at that port. Other contracts are in course of negotiation; so that the gas coal trade is active. Coke is firm; and though gas coke is more plentiful, the price is fairly well maintained. Good gas coke is from 12s. 6d. per ton f.o.b.

Scotch Coal Trade.

Trade is stiff, the condition still holding that contracts for forward delivery are being entered into at advanced prices. Current sales are barely sufficient to take up the coal coming into the market. The prices now quoted are: Ell 9s. to 10s. 6d. per ton f.o.b. Glasgow, splint 10s. to 10s. 3d., and steam 9s. to 9s. 3d. The shipments for the week amounted to 344,306 tons—an increase of 17,822 tons upon the previous week, and of 40,738 tons upon the corresponding week of last year. For the year to date, the total shipments have been 12,490,755 tons—an increase of 613,259 tons upon the corresponding period.

New Water Supply for Lincoln.—Last Wednesday, the Mayor of Lincoln (Mr. W. S. White) laid at Burton Lane End the first pipe of the rising main which is to convey the new water supply from Elkesley to Lincoln. Addressing the company, he said the total cost of the work was £190,000. Of this sum, the pipes had cost £50,000, the laying of them £16,000, the bridge over the Trent £8000, the engines £30,000, the buildings £12,000, four boreholes £7000, the water-tower £13,000, electrical connection £2000, the trunk mains in the city £12,000, and the reservoir £25,000. The Water Engineer (Mr. Niel M'K. Barron) presented the Mayor with a silver facsimile of the pipe, with a copy of the inscription engraved thereon. After the ceremony, the company proceeded to the site of the new reservoir at Bracebridge Heath, and inspected the work in progress there.



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&c., &c.

Sales of Stocks and Shares.

At the Mart, Tokenhouse Yard, E.C., last Tuesday, Messrs. A. & W. Richards obtained excellent prices for two new issues of capital which they had received instructions from Directors to offer for sale. The first lots consisted of £5000 of "C" consolidated stock of the Aldershot Gas, Water, and District Lighting Company, ranking for a maximum dividend of 5 per cent., and entitled, in view of past dividends, to receive this rate. It was all placed at £104 10s. to £105 per £100 of stock. Following this came an issue of a like nominal amount of 4 per cent. consolidated preference stock, which fetched from £95 to £99 10s. per £100. A new issue of "B" shares of £5 each in the Pinner Gas Company, Limited, ranking for a standard dividend of 7 per cent., subject to the sliding-scale (the last dividend on similar shares having been at the rate of £8 8s. per cent.), was next offered; and they were sold at £8 10s. to £8 12s. 6d. each. A few second perpetual £100 debentures in the Company, bearing interest at 5 per cent., fetched £110 to £110 10s. apiece. The last lots consisted of fully-paid £10 ordinary shares in the Gas-Meter Company, Limited; and they realized £12 15s. per share. At Leeds, Messrs. Hollis and Webb sold by auction some new 7 per cent. stock in the Castleford and Whitwood Gas Company, at prices ranging from £164 to £177 per £100. On the same occasion, fifteen £10 new shares in the Wakefield Gas Company were disposed of at £18 10s. 6d. each; and twelve £1 shares in the Grassington Water Company realized £1 16s. each. At the Griffin Hotel, Amersham, recently, Messrs. Hamnett, Raffety, and Co. offered for sale 3000 shares and 20 debenture bonds in the Amersham, Beaconsfield, and District Water-Works Company, Limited. The amount realized by the sale was £5700.

Gas Testing in London.—At the meeting of the London County Council last Tuesday, the report of the Public Control Committee on this subject, given in the "JOURNAL" for the 26th ult. (p. 266), was received without comment.

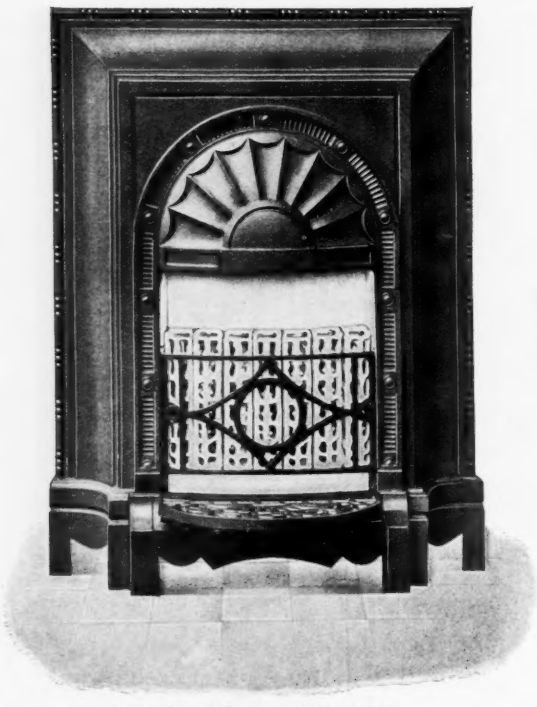
The New Gas Supply for Hailsham.—In the last number of the "JOURNAL," we recorded the inauguration of the new gas supply for Hailsham, which is being furnished by the Eastbourne Gas Company. The event is referred to by the "Eastbourne Chronicle" as follows: "Hailsham has been flooded with the cheap and brilliant article dispensed by the Eastbourne Gas Company; and the streets and houses, equally with the inhabitants themselves, are radiant. A twist of the magic lever by the venerable Chairman of the Company (Dr. Jeffery), and the trick was done. The residents and traders are to be congratulated on their good fortune; and though it be from the shrewd business enterprise of an outside Company that their new-found advantages are derived, they will none the less fully appreciate the change, and none the less readily wish well to their plucky deliverers. Any lingering sentiment of regret at parting from an old local undertaking must soon vanish before the cheering effulgence of the Eastbourne illuminant, and the still more potent influence of reduced gas bills."

Universal Gas Methane and Buisson Hella Company.

The Company announce that an extraordinary general meeting will be held on Thursday, at the registered offices, No. 54, Cheapside, when a resolution will be submitted: "That the Company be wound up voluntarily, and that Robertson Lawson, of No. 34, Old Broad Street, in the City of London, England, Chartered Accountant, and Georges Lemarquis, one of the Judicial Administrators of the Civil Tribunal of the Seine, be, and they are hereby, appointed Joint Liquidators." It is stated by the "Financial Times" that the meeting is to take place under order of the High Court of Justice, to consider a scheme of arrangement under which the Company will go into voluntary liquidation, and the creditors of the Company and all expenses of the liquidation are to be paid in full out of the assets other than the participating shares series "A" and series "B" in the French Company called the Société Industrielle du Gaz Methane; and if the assets shall be insufficient for the purpose, the balance to be provided to the satisfaction of the said Liquidators without any right to recoupment out of the said participating shares. The said participating shares are to be divided among the shareholders as follows: Holders of the 300,000 preference shares shall receive one participating share series "A" for every five preference shares, and one participating share series "B" for every ten preference shares held; and holders of the 600,000 ordinary shares will receive one participating share series "A" for every ten ordinary shares, and one participating share series "B" for every five ordinary shares held by him.

Twineham Water Supply.—Mr. F. H. Tulloch, M.Inst.C.E., on behalf of the Local Government Board, recently held an inquiry into an application by the Cuckfield Rural District Council to borrow £1300 for the purposes of water supply in the parish of Twineham. Mr. C. H. Waugh, the Clerk to the Council, informed the Inspector that the estimated population of the parish, which was the smallest in the Cuckfield Union, was 309; and water was greatly needed for domestic purposes. The present supply was derived from shallow wells. Terms had been agreed upon with the Burgess Hill Water Company to supply water in bulk at 1s. 6d. per 1000 gallons for thirty years.

The Eight Hours Act and Decreased Coal Shipments.—At the last monthly meeting of the Cardiff Chamber of Commerce, the President (Mr. A. J. Griffiths) said the net decrease in the shipment of coal from the South Wales ports for the month of September was 22,989 tons. Cardiff still showed an increase of 368,000 tons. But it was being rapidly brought down; and if the present state of affairs continued, the increase would by the end of the year be nearly all wiped out. They had not very far to look for the cause. It was obvious that the falling-off of the output was attributable to the working of the Eight Hours Act; and it looked as if they would have to put up with a permanent decrease of 10 per cent. in the output owing to the introduction of this unfortunate measure.



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The Charges of the Metropolitan Water Board.

The following letter on this subject appeared in "The Times" last Wednesday: "I think it would be interesting if one of your legal correspondents would explain how the decision of Mr. Justice Neville in the case of the South Suburban Gas Company [*ante*, p. 191] can be reconciled with that of the Brighton and South Coast Railway, decided in the Westminster County Court. In the earlier case, the Judge decided that the words 'railway purposes' included a supply of water for lavatories, &c., which are referred to in section 25 as domestic. In the later case, the Judge decides that 'trade purposes' do not include such supplies. Both sets of words are taken from section 16 of the Charges Act, and that section appears to refer to 'trade' and 'railway' purposes in identical terms." A correspondent writing under the *nom de plume* of "Inner Temple," replied to this letter as follows: "The answer to your correspondent is that in all probability the two decisions cannot be reconciled, and that Mr. Justice Neville's judgment overrules the decision of the County Court Judge, which was referred to in the argument of the South Suburban Gas Company's case. The test in all cases is the use to which the water is put. If this is a domestic use, such as lavatories, &c., the supply, to whomsoever provided, is a supply for domestic purposes, and chargeable at the domestic rates, subject to the modifications set out in section 9 and other sections of the Act."

Fire Caused by Flood.—Owing to the heavy rains last week, Folkestone and Dover suffered very severely from flood; and at the house of Major Anderson, in Folkestone Road, Dover, floating furniture came into contact with a lighted gas-jet and was set on fire. The police, who were with their fire-engine pumping out the water from adjoining premises, were called, and they soon extinguished the fire.

Suicide of an Electrical Engineer.—Last Tuesday morning, Mr. Francis Hastings Medhurst, a consulting electrical engineer, and the Unionist candidate for Stafford, committed suicide by shooting himself in a hotel at Croydon. At the inquest on Thursday, the father of the deceased said he believed his son's mind had become unhinged by political and financial worries. The Jury returned a verdict of "Suicide during temporary insanity." Mr. Medhurst will be remembered by some of our readers, as he read a paper on "Electricity Supply from Town Gas" at the meeting of the Gas Institute in Edinburgh in 1895.

Two Children Suffocated by Gas.—A girl twelve years old and her brother five years of age, the children of a toolmaker named Micklewright, were suffocated by gas at their home in Erdington on Monday night of last week. They were in a bedroom 10 feet square, which had a window and ventilator, but no chimney. On Tuesday morning, the father noticed a smell of gas, and found the children dead in bed, with the gas-tap turned full on. His idea was that the little girl, in turning out the light, might have accidentally moved the tap on again. The mother said she went into the children's room before going to bed. The gas was turned off, and she did not detect any smell of gas. The Jury returned a verdict of "Accidental death."

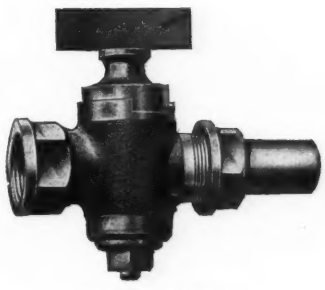
New Joint-Stock Companies.—Tar Paving, Limited, has been registered with a capital of £1000, in £1 shares, to acquire any rights or interests in respect of slag at Frodingham, Lincolnshire. Porhydrometer, Limited, is the title of a Company formed with a capital of £860,000, in £1 shares, to carry on the business of ironfounders, engineers, manufacturers of and dealers in porhydrometers, weighing appliances and other machinery, &c. [The porhydrometer was described in the "JOURNAL" for the 3rd of August last.] It has already been mentioned that among the new limited liability undertakings recently registered was Clark's Syphon Stove Company. It has been formed, with a capital of £8000, in £1 shares, to take over the business of gas syphon stove manufacturers carried on by the Richmond Gas Stove and Meter Company, Limited, at Highbury, N., as S. Clark and Co. The first Directors are Messrs. T. Dwerryhouse, H. M. Thornton, J. Coxon, J. A. Ransome, J. F. Atkin, and J. W. Glover; and the Secretary is Mr. J. W. Slack, of Warrington.

Quality of Pontypool Water.—At the monthly meeting of the Pontypool Urban District Council last Wednesday, a letter was received from the Secretary of the Pontypool Gas and Water Company (Mr. T. B. Pearson), in reply to a communication from the Council, calling attention to adverse reports in regard to the Company's water supply by Mr. G. R. Thompson, the County Analyst. Mr. Pearson stated that samples of the water had been submitted to Dr. Thresh, who assured the Company that the *B. coli* was absent in both samples submitted to him. The Company had taken steps to effectually filter all the water supplied by them, and were further increasing their filtration plant. The Council should, in their opinion, replace the old ball type of hydrants by new valve hydrants, as the former might prove a source of danger whenever it was necessary to turn off the water to effect any repairs. Dr. Thresh stated that "both waters are of good quality, and well fitted for domestic purposes." After some discussion, the matter was referred to the Sanitary Committee.

Shrewsbury Water Supply.—With a view to improving the water supply from the River Severn, the Shrewsbury Corporation have just erected a mechanical pressure filter house; and this was formally opened last Thursday. It was explained by Alderman Morris, the Chairman of the Water Committee, that by the installation of the pressure filters the Council could fairly claim to have solved the water problem of the town, perhaps not to the satisfaction of theorists or faddists, but in a manner which must satisfy practical people. Time worked wonders. On one hand, it had provided them with these pressure filters, which were little thought of over here some years ago. He wished to make it clear that they did not put forward the filtered Severn water for drinking. Fortunately, Shrewsbury was happy in having a separate drinking water supply. He concluded by asking the Mayor to accept as a small memento of the occasion a goblet, which had been purchased by the members of the Water Committee, to show their appreciation of the good work Mr. Blower had done. Mr. Peter Bell (of the firm of Messrs. Bell Bros.) also presented a gold key to his Worship. Both the gifts bore suitable inscriptions; and the Mayor briefly acknowledged them—remarking that he had not anticipated anything of the kind. The Mayor then proceeded to the filter-house, and formally opened it.

MAIN TAPS

No. 119.



ROUND GASWAY.

No. 64.

OBLONG GASWAY.

SEND FOR
PRICES
AND SAMPLES.

SAWER & PURVES,

MANCHESTER & NOTTINGHAM.

Agent for Scotland:
J. D. GIBSON, 2, CAUSEYSIDE STREET, PAISLEY.

Electricity Supply Losses at Kingston.—The 15th annual report on the subject of the Kingston-on-Thames municipal electricity undertaking has just been published. Mr. J. E. Edgcome, the Borough Electrical Engineer, shows an increase of 82 consumers and 5734 lamps, &c., of 8-candle power, which, he says, is "the largest increase in any one year since the beginning of the undertaking." But, in spite of this increase, the deficit on the year's working is £1251 13s. 8d., compared with £884 15s. 11d. last year. The total capital outlay now stands at £103,429, of which £29,453 has been repaid; and there are 1106 consumers with connections equal to 50,963 lamps of 8-candle power—the electricity supplied to them being 568,749 units. During the fifteen years the undertaking has been run by the Corporation, the net loss to the ratepayers has amounted to £12,378.

An Eyesore in the City.—Under this heading the following letter, signed "M. D.," appeared in "The Times" last Wednesday: "Although I have been a wayfarer in the City for many years, I never till lately took note of the two gas-standards which are placed on the steps of the west front of St. Paul's Cathedral. When one realizes the hideous unseemliness of these, and considers how such structures would certainly be rendered objects of grace and beauty in a corresponding position in any great ecclesiastical building on the Continent, one is ashamed, and almost stupefied, to believe that we in London have so long endured anything so mean and unworthy. May I venture to suggest that the Lord Mayor should signalize his departure from the Mansion House by bringing this matter before his fellow-citizens, and securing a few hundred pounds wherewith to replace these unsightly objects with something artistic and appropriate in bronze?"

At a meeting of the Hoyland Urban Council, it has been decided to make the Elsecar Gas Company an offer for the purchase of their gas-works.

At a meeting of the Bedale Urban District Council, a communication was read from the Local Government Board declining to grant leave to borrow a sum for a water-works scheme for a period of longer than 28 years. The Council originally asked for 50 years; and it has now been agreed to apply to the Board for a period of 35 years in which to repay the loan.

At the inquest, at Cardiff, on the body of a postman's wife who had died through inhaling gas, her stepfather stated that she used to go to see fortune-tellers frequently. The previous week she said that a fortune-teller told her she had a mother very ill, and a little stepsister who would have nothing to do with her. The deceased also said: "When she asked me to look in the crystal, I saw myself in a chair deliberately committing suicide with gas." The Jury found that deceased committed suicide while of unsound mind and suffering from delusions.

The "West Ham Express" informs its readers that Mr. Will Thorne, M.P., has been busy at Leeds among the Corporation workmen who have been demanding certain improvements of wages and conditions. As a result of his efforts as chief officer of the Gas Workers and General Labourers' Union, a strike of about 1000 men has been averted. An advance of 1s. per week has been obtained for about 188 ashpit men, 80 horse drivers, and 143 channellers, amounting in all to about £1060 per annum. The question of the practicability of a 48 hours' week has been left to the Sanitary Committee.

We have received a small pamphlet which the Carron Company have just issued in connection with their new season's gas-fires. It is a very neat production in an attractive wrapper. A special feature is a group of various canopies, having chaste brass decorations, any of which can be fitted to certain stoves of which particulars and an illustration are given on the facing page. At the end of the pamphlet the Company's gas-heated steam-radiators are shown in plain and ornamental patterns, and also their patent hygienic induction condensing gas-stove, which is constructed according to the requirements laid down by the "Lancet" Special Analytical Commission.

After dealing last week in their City Notes with the proposal to grant a pension to the retiring President of the Grand Trunk Railway, the "Pall Mall Gazette" proceeded to make the following general remarks (which, it is pointed out, do not refer to Sir C. Rivers-Wilson): "There is, we fear, a far too free and easy method of regarding the relative positions of directors and shareholders, especially when it is a case of using the money of the latter to pay the former. In fact, the whole joint-stock system is being too frequently used as a mere excuse for affording the idle and the incompetent, but, happily for them, the influentially placed, a comfortable livelihood. Nobody who knows anything at all about joint-stock companies—and many officials could tell a tale, were they not tongue-bound—can doubt this fact. On many boards we have the mere adventurer or the useless hanger-on, whose only real capacity is to draw fees or attend meetings to sign cheques, transfers, and such-like routine. Not too often do we find on any board more than a member or two who get much beyond this stage, or are of any real use. It is the sickening feature of joint-stock enterprise. Take, for instance, a gas company of some standing. We understand that on the particular board referred to there is not a single director who really thoroughly understands the practical gas work. That does not so much matter. One of them is a capable business man, of good general knowledge, and a fair idea of the gas work, and is quite capable of looking after the officials who do understand it thoroughly. So this gentleman is the busy man of the board, and another is a mere financier. But here, again, he is very useful as representing important City interests. But what of the rest? There are several of them; and, from all we hear, there is not one whose capacity is far above drawing fees or signing cheques. And these gentlemen draw quite a respectable sum per annum between them for work which a junior clerk could do at 30s. a week. When one of the really active directors retires, we have a demand for a pension for doing his duty, perhaps in mere spare time—services for which he is paid handsomely. And if by chance the business is sold, quite likely the directors secure a big bonus for themselves and handsome allowances for the leading officials. Would this be done in the case of a private business? The real owner (the shareholders in the case of a company) might of his grace grant something to his servants. But with joint-stock enterprise it is too often a case of a very liberal dole to the people who have really little absolute right to it."

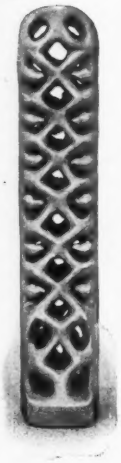
The "ONYX."

13-inch Fire Opening.

NOTE

The Wide Fire Opening, Intense Pillar Fuel, and Oval Fire Front,

as introduced by us last Season.



RESULTS OBTAINED ARE UNEXCELLED FOR EFFICIENCY AND ECONOMY.

ALL SINGLE ROW FUEL FIRES ARE SUPPLIED WHEN REQUIRED WITH THESE IMPROVEMENTS.

The "AGATE."

15-inch Fire Opening.

The Parkinson Stove Company, Ltd.

(Incorporating Maughan's Patent Geyser Co.),

BIRMINGHAM: Stour Street.

LONDON: Office and Show-Rooms: 129, High Holborn, W.C.

In order to cope with the great increase of their business, the Bland Light Syndicate, Limited, have taken additional premises at No. 15, Little Trinity Lane, E.C.

To prevent any repetition of the recent scene at the baths of the Worthing Corporation, when, owing to the failure of the electric light, swimmers had to grope their way out of the water and spectators their way from the building by the light of matches and a bicycle lamp or two, gas-jets are to be fixed for use in case of emergency.

In addition to the gas companies named in the "JOURNAL" for the 19th ult., the Meldrum breeze furnace has been supplied to the Corporations of Birmingham, Coventry, Dumfries, Hamilton, Liverpool (for the Fazakerley Gas-Works), and Port Glasgow; to the Barry, Mountain Ash, Sowerby Bridge, and Teignmouth Urban District Councils; and to the Great Yarmouth Water Company.

The Directors of Meters Limited have declared interim dividends to the 30th of September at the rates of 5½ and 4 per cent. per annum on the preference and ordinary shares respectively.

A special meeting of the Bideford Town Council was held last Thursday to consider an application from the Gas Company for a special supply of 500,000 gallons of water to fill a new gasholder tank. It was stated that water was now coming in freely, and that the reservoirs contained 12 million gallons, and there was a prospect that they would be overflowing before Christmas. The members were of opinion that the water could be supplied without any risk to the domestic supply. It was said that there was another source from which the Company could obtain the water by pumping if the Corporation did not supply it. The Council decided to offer the quantity required for £35 and out-of-pocket expenses.

WANTED, FOR SALE, CONTRACT, &c., ADVERTISEMENTS IN THIS WEEK'S "JOURNAL."

Situations, &c., Vacant.

FITTERS (REPAIRING COOKERS, &c.). No. 5149.
WORKING MANAGER. South Brent Gas-Works.

Situations, &c., Wanted.

REPRESENTATIVE OR FOREMAN (METER, &c., WORKS). No. 5148.
SUPERINTENDENT OF INCANDESCENT STREET LIGHTING, &c. J. W. Coates, Bradford.

William Lindley Bequest Scholarship.

Applications by Nov. 30.

Plant, &c. (Second-Hand), for Sale.

EXHAUSTER, CONDENSERS, TANK, WASHERS, PURIFIERS, COAL BREAKER AND ELEVATOR. Walker and Wallsend Gas Company.
LOW-PRESSURE LIFT. West Bromwich Gas-Works.

Plant, &c. (Second-Hand), Wanted.

PURIFIER. F. A. Greene, 3, Miles Lane, E.C.

Meeting.

ORIENTAL GAS COMPANY. London Offices. Nov. 17. Twelve o'clock.

Stocks and Shares.

ALLIANCE AND DUBLIN CONSUMERS' GAS COMPANY. Nov. 23.
BOGNOR WATER COMPANY. Nov. 23.
LITTLEHAMPTON GAS COMPANY. Nov. 17.
SOUTHEND GAS COMPANY. Nov. 16.
TENDRING HUNDRED WATER COMPANY. Nov. 16.
WORTHING GAS COMPANY. Nov. 23.

TENDERS FOR

Exhausting Plant, &c.

CLEATOR MOOR GAS DEPARTMENT. Tenders by Nov. 19.

Gasholder, &c.

BUDAPEST CORPORATION. Tenders by Nov. 30.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer; not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders for Alterations in, or stoppages of, PERMANENT ADVERTISEMENTS should be received by the FIRST POST on SATURDAY.

Wanted, For Sale, and Tender Advertisements, Six Lines and under, 3s.; each additional Line, 6d.

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Telegrams: "GASKING, LONDON." Telephone: P.O. 1571a Central.

GAS COMPANIES' STOCK AND SHARE LIST.

Referred to on p. 303.

Issue	Share.	When ex-Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p.c.				£ s. d.
590,000	10	Oct. '4	10	Alliance & Dublin 10 p.c.	17—18	−½	5 11 1
298,955	10	"	7	Do. 7 p.c.	12½—13	..	5 7 8
310,000	Stk.	July 14	4	Do. 4 p.c. Deb.	96—100	..	4 0 0
200,000	5	Oct. 28	6½	Bombay, Ltd.	5⅝—6*	..	5 8 4
40,000	5	"	6½	Do. New, £4 paid	4⅛—4⅜*	..	5 9 1
50,000	10	Aug. 26	15	Bourne-mouth Gas and Water	10 p.c.	28—28½	.. 5 5 3
					B 7 p.c.	16½—16⅝	.. 4 3 7
					Pref. 6 p.c.	15½—15⅝	.. 3 16 2
311,810	10	"	7	Brentford Consolidated	254—257	..	4 17 3
75,000	10	"	6	Do. New	190—192	..	4 19 0
380,000	Stk.	Aug. 12	12½	Do. 5 p.c. Pref.	120—122	..	4 2 0
300,000	"	"	5½	Do. 4 p.c. Deb.	100—102	..	3 18 5
50,000	"	"	5	Brighton & Hove Orig.	208—213	..	5 3 3
206,250	"	June 11	4	Do. A Ord. Stk.	150—152	..	5 5 3
220,000	Stk.	Sep. 10	1	British	42—43	..	4 13 0
246,320	"	"	8	Bromley, A 5 p.c.	118—120	..	5 0 0
460,000	20	Oct. 14	10	Do. B 3½ p.c.	88—90	..	5 0 0
109,000	Stk.	Aug. 26	6	Do. C 5 p.c.	106—108	..	5 1 10
165,700	"	"	4½	Buenos Ayres (New) Ltd.	13½—14	..	5 0 0
82,278	"	"	5½	Do. 4 p.c. Deb.	96—98	..	4 1 8
55,000	"	June 25	3½	Cape Town & Dis., Ltd.	4—5	..	—
500,000	10	Oct. 14	7	Do. 4½ p.c. Pref.	5⅛—5⅜	..	—
250,000	Stk.	June 25	4	Do. 6 p.c. 1st Mort.	48½—49½	..	6 1 3
100,000	10	—	—	Do. 4½ p.c. Deb. Stk.	82—84	..	5 7 2
100,000	10	—	—	Chester 5 p.c. Ord.	106½—108½	..	4 12 2
50,000	50	May 3	6	Commercial 4 p.c. Stk.	109—111	..	4 13 8
100,000	Stk.	June 25	4½	Do. 3½ p.c. do.	104—106	..	4 14 4
157,150	Stk.	Aug. 12	5	Do. 3 p.c. Deb. Stk.	81—83	..	3 12 3
1,493,280	Stk.	Aug 26	5⅝	Continental Union, Ltd.	97—99	..	5 1 0
560,000	"	"	5	Do. 7 p.c. Pref.	138—140	..	5 0 0
475,000	"	June 11	3	Derby Con. Stk.	121—123	..	4 1 4
800 000	Stk.	"	5	Do. Deb. Stk.	103—105	..	3 16 2
200,000	"	"	7	East Hull 5 p.c. Ord.	97—99	..	5 1 0
492,370	Stk.	—	5	European, Ltd.	24½—25	..	4 16 0
55,000	"	—	4	Do. £7 10s. paid.	18½—19	..	4 14 9
15,141,545	Stk.	Aug. 12	4⅜	Gas light and Coke	4 p.c. Ord.	104—105	−1 4 8 10
2,600,000	"	"	3½		3½ p.c. max.	88—90	.. 3 17 9
3,799,735	"	"	4		4 p.c. Con. Pref.	104—105	.. 3 16 2
4,193,975	"	June 11	3		3 p.c. Con. Deb.	85—87	.. 3 8 11
258,740	Stk.	Sep. 10	5	Hastings & St. L. 3½ p.c.		92—94	.. 5 6 4
82,500	"	"	6½	Do. do. 5 p.c.		117—119	.. 5 9 3
70,000	10	Sep. 29	11	Hongkong & China, Ltd.		17½—17⅝	.. 6 4 0
131,000	Stk.	Sep. 10	6½	Ilford A and C		138—140	.. 4 12 10
65,782	"	"	5	Do. B		105—107	.. 4 13 6
65,500	"	June 25	4	Do. 4 p.c. Deb.		102—104	.. 3 16 11
4,940,000	Stk.	May 13	8	Imperial Continental		180—182	.. 4 7 11
1,235,000	Stk.	Aug. '12	3½	Do. 3½ p.c. Deb. Red.		95—97	.. 3 12 2
195,242	Stk.	Aug. 26	6	Lea Bridge Ord. 5 p.c.		119—121	.. 4 19 2
561,000	Stk.	"	10	Liverpool United A		223—225	.. 4 8 11
718,100	"	"	7	Do. B		166—168	.. 4 3 4
306,083	"	June 25	4	Do. Deb. Stk.		104—106	.. 3 15 6
75,000	5	June 11	6	Malta & Mediterranean		4⅛—5⅛	.. 5 17 1
560,000	100	Oct. 1	5	Met. of 5 p.c. Deb.		99—102	.. 4 18 0
250,000	100	"	4½	Melbourne 4½ p.c. Deb.		100—102	.. 4 8 3
541,920	20	May 27	3⅜	Monte Video, Ltd.		12¾—13¼	.. 5 5 8
1,775,892	Stk.	July 29	4½	Newc'tle & G'tesh'd Con		106—108	.. 4 3 4
518,795	Stk.	June 25	3⅜	Do. 3½ p.c. Deb.		93—94	.. 3 14 6
55,940	10	Aug. 26	7	North Middlesex 7 p.c.		13—13⅜	.. 5 3 8
300,000	Stk.	Apl. 29	8	Oriental, Ltd.		139—141	.. 5 13 6
60,000	5	Sep. 10	8	Ottoman, Ltd.		6⅛—6⅜	.. 6 5 6
31,800	53	Aug. 26	13	Portsea Island A.		137—139	.. 4 19 0
60,000	50	"	13	Do. B.		129—131	.. 4 19 3
100,000	50	"	12	Do. C.		120—123	.. 4 17 7
114,800	50	"	10	Do. D and E.		101—103	.. 4 17 1
398,490	5	Oct. 28	7	Primitiva Ord.		6⅞—7⅛*	.. 4 18 4
796,980	5	July 29	5	Do. 5 p.c Pref.		5⅛—5⅜	.. 4 10 11
488,902	100	June 1	4	Do. 4 p.c. Deb.		95—97	.. 4 2 6
1,000,000	10	Oct 14	8	River Plate Ord.		16⅛—16⅜	.. 4 15 7
312,650	Stk.	June 25	4	Do. 4 p.c. Deb.		96—98	.. 4 1 8
250,000	10	Sep. 29	8	San Paulo, Ltd.		14⅛—14⅜	.. 5 8 6
62,500	10	"	6	Do. 6 p.c. Pref.		11⅞—12⅛	.. 4 18 0
125,000	50	July 1	5	Do. 5 p.c. Deb.		51—52	.. 4 16 2
135,000	Stk.	Sep. 10	10	Sheffield A		230—232	.. 4 6 2
269,984	"	"	10	Do. B		230—232	+1 4 6 2
523,500	"	"	10	Do. C		230—232	+1 4 6 2
70,000	10	Oct. 14	10	South African		12¼—12⅜	.. 7 16 11
6,429,895	Stk.	Aug. 12	5⅛	South Met., 4 p.c. Ord.		120—122	.. 4 7 4
1,895,445	"	July 14	3	Do. 3 p.c. Deb.		85—87	.. 3 8 11
209,823	Stk.	Aug. 26	8	South Shields Con. Stk.		154—156	.. 5 2 7
603,000	Stk.	Aug. 12	5⅛	S'th Suburb'n Ord. 5 p.c.		119—121	.. 4 10 11
60,000	"	"	5	Do. 5 p.c. Pref.		120—122	.. 4 2 0
117,058	"	July 14	5	Do. 5 p.c. Deb. Stk.		122—124	.. 4 0 8
502,310	Stk.	May 13	5	Southampton Ord.		111—113	.. 4 8 6
120,000	Stk.	Aug. 12	6⅞	Tottenham and Edmonton	A 5 p.c.	133—135	.. 5 1 9
453,940	"	"	5⅝		B 3½ p.c.	111—113	.. 4 15 3
149,470	"	June 25	4		4 p.c. Deb.	100—102	.. 3 18 5
182,380	10	June 11	8	Tuscan, Ltd.		9—9½	.. 8 8 6
149,900	10	July 1	5	Do. 5 p.c. Deb. Red.		99—101	.. 4 19 0
236,476	Stk.	Aug. 14	5	Tynemouth, 5 p.c. max.		109—111	.. 4 10 1
255,636	Stk.	Aug. 26	6⅝	Wands-worth	B 3½ p.c.	139—141	.. 4 14 0
79,416	"	June 25	3		3 p.c. Deb. Stk.	73—75	.. 4 0 0
895,872	"	Aug. 12	5⅝	West Ham 5 p.c. Ord.		124—126	.. 4 5 4
210,000	"	"	5	Do. 5 p.c. Pref.		127—129	.. 3 17 6
253,300	"	June 25	4	Do. 4 p.c. Deb Stk.		112—114	.. 3 10 2

Prices marked * are "Ex div."

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O'NEILL'S OXIDE
For GAS PURIFICATION.
LARGEST SALE OF ANY OXIDE.

SPENT OXIDE PURCHASED IN ANY DISTRICT.

GAS PURIFICATION & CHEMICAL CO., LD.,
PALMERSTON HOUSE,
OLD BROAD STREET, LONDON, E.C.

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"VOLCANIC" FIRE CEMENT.
Resists 4500° Fahr. Best for GAS-WORKS.
ANDREW STEPHENSON, 182, Palmerston House, Old Broad Street, London, E.C. "Volcanism, London."

BROTHERTON & CO., LIMITED.
Offices: City Chambers, LEEDS.
Correspondence invited.

LUX'S GAS PURIFYING MASS.
See Advertisement on p. 352.
FRIEDRICH LUX, LUDWIGSHAFEN-AM-RHEIN.

AMMONIACAL Liquor wanted.
CHANCE AND HUNT, LTD., Chemical Manufacturers, OLDBURY, WORCS.
Telegrams: "CHEMICALS."

TAR WANTED.
National Telephone 7002. Telegrams: "UPRIGHT."
Apply, THOMAS HORROCKS
Albert Chemical Works, BRADFORD, MANCHESTER.
Pitch, Creosote, Brick and Fuel Oils, Benzol, Solvent Naphtha, Sulphate of Ammonia.

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RETORT SETTINGS, COAL-TESTING PLANT, BOILER FIRING.
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WITH AND WITHOUT DIALS.
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Apply, stating Wages required (no House), and enclosing *Copies* of Testimonials, to B. L. Taylor, Gas-Works, Moretonhampstead.

"WILLIAM LINDLEY BEQUEST" SCHOLARSHIP.

APPLICATIONS are invited for this SCHOLARSHIP, which is in the Administration of the Committee of Management of the Benevolent Fund of The Institution of Civil Engineers, is tenable for three years, and is of the value of £40 per Annum.
The main conditions are that the holder shall be the son of a Corporate Member, or of an Associate of The Institution, between 16 and 20 years of age, who is desirous of entering the Civil Engineering profession, but whose means are inadequate to defray the incidental expenses. In the event of there being more than one suitable Applicant preference will be given to any Candidate whose father's career has been devoted to the Sewerage and Water Supply of Towns, or whose inclination tends towards taking up that branch of the Profession.
The Scholarship will be vacant on the 1st of January, 1910; and Applications should be addressed to the Honorary Secretaries of the Fund, No. 25, Great George Street, S.W., not later than the 30th of November next.
Nov. 1, 1909.

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One Bryan Donkin EXHAUSTER, combined on One Bedplate with Horizontal Steam-Engine, complete with Inlet and Outlet Valves. Capacity, 30,000 Cubic Feet of Gas per Hour.
One ANNULAR CONDENSER, with Four Vertical Tubes 30 ft. high, Inner Tube 2 ft 8 in. diameter, Outer Tube 3 ft. 6 in. diameter, with Two 15-inch diameter Disc Valves, and 4-inch Tar Run-Off with Seal Pots.
One PIPE CONDENSER, 25 ft. high, with Twelve 12-inch diameter Pipes, Two 15-inch Disc Valves, and 6-inch Tar Run-Off and Seal Pots.
One CAST-IRON TANK, 18 ft. 4 in. by 14 ft. by 5 ft. deep, Machine Faced Joints, Plates ¾-inch thick.
Two Livesey WASHERS, to pass 500,000 Cubic Feet of Gas per Twenty-Four Hours
Four PURIFIERS, 13 ft. square by 5 ft. deep, with Water Lute Covers, Connections, and Four-Way Valves, also Lifting Gear with Girder.
One COAL BREAKER and ELEVATOR capable of handling 20 Tons of Coal per Hour.
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CLEATOR MOOR URBAN DISTRICT COUNCIL.

TENDERS are invited by the above Council for the work of DUPLICATING the EXHAUSTING PLANT at their Gas-Works on a new site.
A copy of the Drawings and Specifications may be obtained from the undersigned on payment of £1 1s., which will be returned on receipt of a *bonâ-fide* Tender.
Sealed Tenders, endorsed "Exhauster," and addressed to the undersigned, to be delivered, at the Public Offices, Cleator Moor, not later than Friday, the 19th day of November, 1909.
The Council do not bind themselves to accept the lowest or any Tender.
Henry Rothery,
Clerk to the Council.
Public Offices, Cleator Moor,
Oct. 19, 1909.

ORIENTAL GAS COMPANY, LIMITED.

NOTICE is Hereby Given, that an ORDINARY GENERAL MEETING of this Company will be held at the Company's Office, Finsbury House, Blomfield Street, London, E.C., on Wednesday, the 17th day of November, 1909, at Twelve o'clock noon precisely, for the following purposes: To receive the Directors' Report and the Accounts of the Company for the Year ended the 30th of June, 1909, to declare a Dividend, and to elect a Director and Auditors in the place of those retiring.
The TRANSFER BOOKS WILL BE CLOSED from the 3rd to the 25th of November, both days inclusive.
By order of the Board,
H. J. Luff,
Secretary.
Finsbury House, Blomfield Street,
London, E.C., Oct. 27, 1909.

No. 90,088/1909. 11.

TENDERS invited for the Construction of a THREE-STORIED, 45,000 m³ IRON-TANK TELESCOPIC GAS-HOLDER, to be built on the Plots No. 1317-1318/4,5,6,7, Tutaj-Utca, Budapest.

THE Municipality of Budapest invites TENDERS for a Three-Storied IRON-TANK GASHOLDER containing 45,000 cubic meters of Gas delivered with all Accessories on the spot, completely fitted up and set working.
Ground Plan and Design of the proposed Gasholder, terms of Building and of Delivery, and Schedules of Tenders and of Contract, may be inspected and obtained against payment of 40 Crowns at the Public Works Office of the Metropolitan-City Budapest, (Budapest, Central-Townhall, 2nd floor No. 256).
The written Tenders are to be drawn up on the Schedules for Tenders and Contracts at disposal; and these, as well as any enclosures, should be in Hungarian language, and put in a Sealed, intact Envelope, which will have to be delivered either directly to Town Councillor Charles Vosits, Director of the 2nd Section of the Council of the Metropolitan-City of Budapest, or to his substitute (Budapest Central-Townhall 2nd floor No. 256), or to be forwarded by Mail in such a manner that the Tender should reach at the appointed time hereafter named.
The Envelope to bear the following address: To the Municipality of the Metropolitan-City of Budapest.
"Tender for the construction of the Gasholder advertised under No. 90,088/1909."
The Tenders Drawn up and Signed in due order, should be put in a Sealed Envelope and submitted until noon of Tuesday the 30th of November, 1909, each sheet of the Tender to bear a 1·—Crown Stamp.
In the Estimate to be submitted in connection with the Tender, the Tenderer will have to state clearly, in numerals, at what Unit Prices he is undertaking each kind of work, he being obliged to indicate the unit prices of each single item of the estimate, to calculate the single amounts on basis of the unit prices, and to state the final amount in letters and figures.
The Tenderer to Sign by his own hand not only the Tender itself, but also every Enclosure—namely the Estimate bearing the Unit Prices and final Amounts, the Plans, the Calculations of Weight and of Stability, &c.
Tenderers are bound to make a Deposit of 30,000 Crowns.
The Deposit to be made either in Cash or in Securities (Bonds) admissible according to the rules in force, latest until midday of the day before the submission, at the Central Treasury of the Metropolitan-City, or at any district Treasury, against Deposit-receipt.
Should the Tender be accepted, then the Deposit will be retained as Guarantee for the true fulfilment of the Contract, without having to be supplemented according to the General Terms relating to Tenders.
The Deposit may be made—always with reference to the No. of the Advertisement—also by Mail, but in this case it should be posted latest the day before the submission.
The Securities will be accepted at 90 per cent. of the latest buying rate quoted by the Stock Exchange of Budapest, but in no case above their nominal value. An exception will be made with the Bonds of the Capital, which, up to their nominal value, will be accepted at the latest rate of Exchange.
No cash, or Saving Bank's Books, nor Securities can be enclosed to the Tender itself as Deposit.
The Deposit Receipt or a copy of same, certified by a Notary Public, or the Post-Office Receipt to be attached to the Tender.
The Tenderer is bound to declare in his Tender that he will deliver the Gasholder completely fitted up and in working order by the 1st of October, 1910, and that accordingly he will commence the construction at latest by the 1st of April, 1910.
The Tenders arrived until the term above named will be Unsealed at midday of the 30th of November, 1909, at the Hall for Public Works, Central-Townhall No. 266, at which proceeding the Tenderers, or their legalized Representatives, may be present.
The final decision regarding the Tenders submitted will be taken latest until the 31st of December, 1909. The Tenders to remain in force until the final decision is taken.
The Council of the Metropolitan-City of Budapest reserve themselves the right of accepting any Tender they choose.
The Town Council of Metropolitan-City of Budapest.
Budapest, Oct. 22, 1909.

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TO BE OBTAINED OF
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SALES BY AUCTION OF GAS AND WATER STOCKS AND SHARES.

MESSRS. A. & W. RICHARDS beg to notify that their SALES BY AUCTION of NEW CAPITAL, ISSUED UNDER PARLIAMENTARY POWERS, and of STOCKS and SHARES belonging to EXECUTORS and other PRIVATE OWNERS in LONDON, SUBURBAN, and PROVINCIAL GAS and WATER COMPANIES, take place PERIODICALLY at the Mart, TOKENHOUSE YARD, E.C.
Terms for Issuing New Capital, and also for including other Gas and Water Stocks and Shares in these Periodical Sales, will be forwarded on Application to Messrs. A. & W. Richards, at 18, Finsbury Circus, E.C.

By order of the Directors of the
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NEW ISSUE OF £21,500 NEW ORDINARY "B" STOCK
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MESSRS. A. & W. RICHARDS will SELL THE ABOVE BY AUCTION, at the Mart, E.C., on Tuesday, Nov. 16, at Two o'clock, in Lots.
Particulars of the Auctioneers, 18, Finsbury Circus, E.C.

By order of the Directors of the
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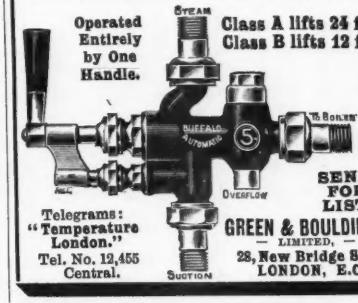

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See Full Page Advertisement, p. III., Oct. 5.

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ROTARY GAS EXHAUSTER
GASOMETER AND C.I. OR

NEWTON, CHAMBERS, & CO.,
LIMITED.
THORNCLIFFE IRON-WORKS, near SHEFFIELD.
Established 1790
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Telegraphic Addresses: "*NEWTON, SHEFFIELD,*" "*ACCOLADE, LONDON.*"

GAS ENGINEERS, IRONFOUNDERS, and CONTRACTORS.

MANUFACTURERS OF EVERY DESCRIPTION OF
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RETORTS AND FITTINGS, MOUTHPIECES WITH SELF-SEALING LIDS.
IMPROVED COAL AND COKE HANDLING PLANT, CONVEYORS, AND ELEVATORS.
CONDENSERS, SCRUBBERS, AND WASHERS.
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GASHOLDERS, CAST-IRON OR STEEL TANKS.
DESIGNS, SPECIFICATIONS, and ESTIMATES FREE.

PIG IRON (special quality) for Engine Cylinders. **GAS COAL** famous for its Unrivalled excellence.

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Chamber-Furnaces

HORIZONTAL, VERTICAL, INCLINED

FOR GAS AND COKE

SO FAR 97 CHAMBERS BUILT AND BUILDING FOR A DAILY PRODUCTION OF

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IN POINT OF EFFICIENCY, COST OF PRODUCTION AND RESULTS

BEST FURNACES IN THE WORLD.

2000 WORKMEN.

ENQUIRIES AT ONCE ATTENDED TO.

Laying Mannesmann Weldless Steel Tubes in the Bed of the Tidal River Teign.

(Teignmouth Water Scheme, comprising 14 miles of Mannesmann Tubes.)

THE

BRITISH MANNESMANN TUBE CO., LTD.,

Salisbury House,

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Makers of Weldless Steel Spigot and Faucet, Flanged, Screwed and Socketted, &c., Tubes, Tubular Lamp Posts, Drums, Standards, &c., &c.

Works: LANDORE, S. WALES. Telegrams: "TUBULOUS, LONDON."

GAS MAIN

THERMOMETERS.

SOME POINTS ABOUT THEM ARE:—

Their robust design ensures a long life.

The Scale is clear, open, and easy to read.

Permanent accuracy is secured by care in the selection and annealing of the Glass Tubes.

The Special Bulb Chamber and separable Socket make the Thermometers very quick in action.

THE CAMBRIDGE SCIENTIFIC INSTRUMENT CO., Ltd.

(Hohmann & Maurer Dept.),

CAMBRIDGE.

MAKERS OF THE FÉRY SPIRAL PYROMETER.

CLEANING COOKERS AND LANTERN REFLECTORS

Undoubtedly the Finest and Best Preparation on the Market for **quickly** removing Burnt Grease from the Enamelled Lining of Cookers and Cleaning Lantern Reflectors is

Clarks "GASCOLITE."

(Registered Trade Mark.)

Can either be applied with a Brush, allowed to stand, Cold, for a few hours, or with Heat for about Half-an-Hour, when Liners and Reflectors can be washed off with Hot or Cold Water and will appear as **new,** or, **put into Tanks** with **Boiling Water,** when Liners and Reflectors will be cleaned in about 20 Minutes.

In cases where a **steam pipe** is connected to bottom of tank, stoves or liners can be **perfectly cleaned** in 5 to 10 minutes.

This Result can only be obtained at **lightning speed** by using **"Gascolite."**

Now being used successfully by Gas Companies throughout the United Kingdom and Abroad.

For Trade Prices apply—

CLARKS LEAD & COLOUR WORKS CO.

Gas Company Specialists, READING.

Established 1832.

GRAETZIN LIGHT

Important Improvements.

BURNERS.

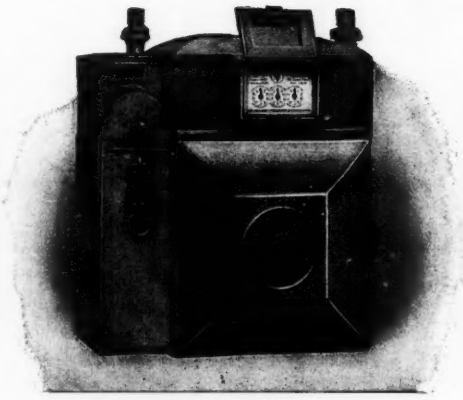
1. **20-Candle Power more light** without increase in the consumption of gas.
2. **Patent Gas Adjuster;** cannot get out of order.
3. **Automatic Gas Regulator,** ensures a constant and unvarying pressure of 35 mm., guarantees a steady light, at the same time obviating waste of gas and blackening of the burner.
4. **Accurate Regulation of the Air Supply.**
5. Burners will be supplied either with Gas Adjuster or Automatic Gas Regulator.
6. The brass casing is heatproof, and, if occasionally cleaned with warm water, will not become discoloured.

LAMPS.

From Lamps with more than one burner, the injectors can be removed from the outside, without taking the lamps to pieces.

R. LAIDLAW & SON (EDINBURGH), LTD.

GAS METER MAKERS.



Thousands of our Meters in use by the largest Gas Companies and Corporations and giving

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Prepayment Wet Meters in Cast-Iron Cases.

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DRAWINGS AND FULL PARTICULARS ON APPLICATION,

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SPLENDID CARBONIZING RESULTS.

HIGHEST RESULTS in GAS MADE and COKE SOLD per Ton of Coal Carbonized, obtained where improved Klönne Retort Settings, constructed by us, are in operation.

Reference can be given to several Works where Regenerators are still working after a life of 10 to 15 Years.

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KLÖNNE SETTINGS A SPECIALITY. High-Class Work only.

GASHOLDER TANKS. MAINLAYING. BUILDINGS.

THE BOYS CALORIMETER

As Used for the Gas Light and Coke Co.'s Tests

In the London Testing Stations,

Is made and supplied by us at a

MUCH LOWER PRICE THAN ANY OTHER MAKER.

CAN BE CERTIFIED IF DESIRED.

ALEXANDER WRIGHT & CO., LTD.,

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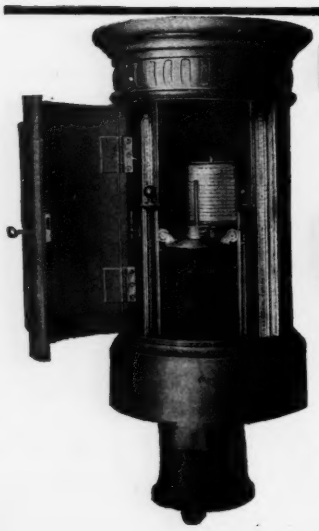

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DISTRICT GOVERNOR

FOR

Ordinary or High Pressure.

PILLAR BOX contains Air-Pressure Holder for Loading the Governor from a distance also Recording Gauge and Inlet and Outlet Pressure Gauges.

LARGE MERCURIAL GOVERNOR.

From a Photo. of 24 in. Size.

May be Loaded by Weights or Air Pressure from a Distance.

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Telegrams:
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Inclined and Horizontal Retort Benches.

CONTRACTORS TO
The Vertical Retort Syndicate, Ltd., London,
FOR ALL THE
BRICKWORK
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DESSAU VERTICAL RETORT INSTALLATIONS.

COAL CONVEYING PLANTS
COMPLETE WITH
ELEVATORS, CONVEYORS, BREAKERS, &c.

THOMAS PIGGOTT & CO., LD.,
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LAPWELDED AND RIVETED STEEL PIPES.

HUMPHREYS & GLASGOW'S
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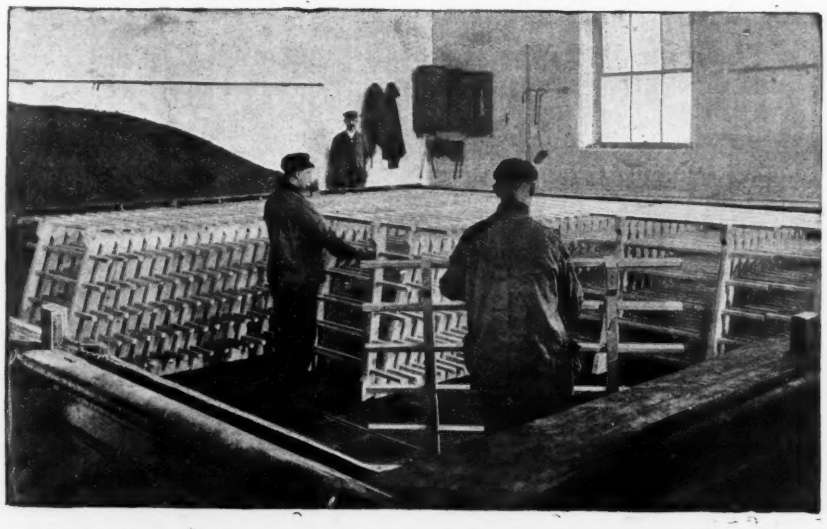
Aggregate Capacity of Plants supplied
227,800,000 cubic feet Daily.

ALL PREVIOUS RECORDS BROKEN (*See below*)

SPENCER'S PATENT HURDLE GRID

The very best Patent Grid on the Market for Holding Oxide Lightly.

IT IS THE FIRST AND THE ORIGINAL DEEP GRID INVENTED.



It is acknowledged by all the leading Gas Managers, that breaking up the Material, and suspending same in the Purifier as it were is the most practical of any system yet made use of.

These Grids are being more extensively used and more successful than ever, not only in this Country, but we are sending a good many Orders abroad. Also we have installed at a certain Works 20 Sets, 5 repeat Orders of 4 Sets each, and at several other places 3 and 4 repeat Orders of 4 Sets each.

And the price of Hurdle Grids is very little more than Flat Grids, and do Three times the work, besides reducing back pressure on the Purifiers more than half.

The Hurdle Grids save their cost in less than 3 Years, and they can be fitted to any kind of Purifier.

The first of a Set of Six Purifiers, 20 feet square, fitted with Spencer's Patent Hurdle Grids. Started Feb. 7, 1906, and run until May 27, 1907, having passed **149,266,000** feet. The Oxide was quite loose and easy to empty. Also over **600** Purifiers have been fitted with these Grids in less than Three-and-a-Half Years. Hundreds of References can be had on Application. Send for Catalogue to—

WALTER SPENCER, GRID WORKS, ELLAND.

PATENT
"FLUXITE"
FIRE
CEMENT

For
STOPPING CRACKS
IN GAS RETORTS.

Makers: JOHN E. WILLIAMS & CO., Lower Moss Lane, MANCHESTER, S.W.

WATER SUPPLIES.

ARTESIAN BORED TUBE WELLS,

Norton's Patent "Abyssinian" Tube Wells.
Deep Well Pumps and Patent Air Lift Pumps.

LE GRAND & SUTCLIFF,
Artesian Well and Waterworks Engineers,
MAGDALA WORKS, 125, BUNHILL ROW, LONDON, E.C.

ARROL-FOULIS
Stoking Machinery
HYDRAULIC COKE PUSHERS
(HUNTER and BARNETT'S PATENT).
WILL DISCHARGE A RETORT IN ONE OPERATION
LARGE NUMBERS IN USE.

Full Particulars may be obtained from the Sole Makers,
SIR WILLIAM ARROL & CO., Limited,
GLASGOW.
[See Illustrated Advertisement, Oct. 19, p. 154.]

OUR DISCOUNT SYSTEM GAINS GROUND DAY BY DAY.

Greatly increases Sale of Gas.

Particulars and fullest description on application.

T. G. MARSH,
28, Deansgate, MANCHESTER.

GAS COAL AND CANNEL.

WILSON CARTER & PEARSON,
LIMITED,
Gas, Steam, and other Fuel for Home and Export.
GAS COKE CONTRACTORS.
CHIEF OFFICES:
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LIME & OXIDE ELEVATORS & CONVEYORS.
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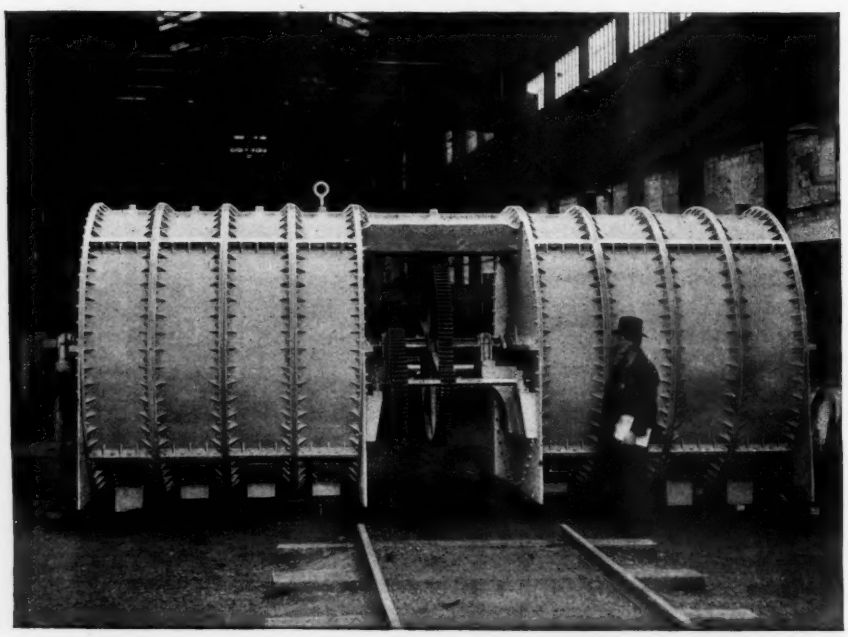
STAMPED AND RIVETED STEEL ELEVATOR BUCKETS.
DETACHABLE CHAINS AND SPROCKET WHEELS.
HIGH-CLASS STEAM ENGINES. BEAM PUMPING-ENGINES, &c.

THE WHESSOE FOUNDRY CO., LTD.
Works: DARLINGTON.



"Whessoe" Rotary Washer-Scrubber, with Central Driving arrangement, Patent No. 27,158, 1904, as supplied to The Stourbridge Gas Company.

London Office: 106, CANNON STREET, E.C.

Welsbach LIGHT

Inverted Arc Lamp, Fig. 623.

Storm Proof—
For Exterior Lighting.

Welsbach-Kern
(Patent) Inverted System

BRITISH MADE.

BRITISH MADE.

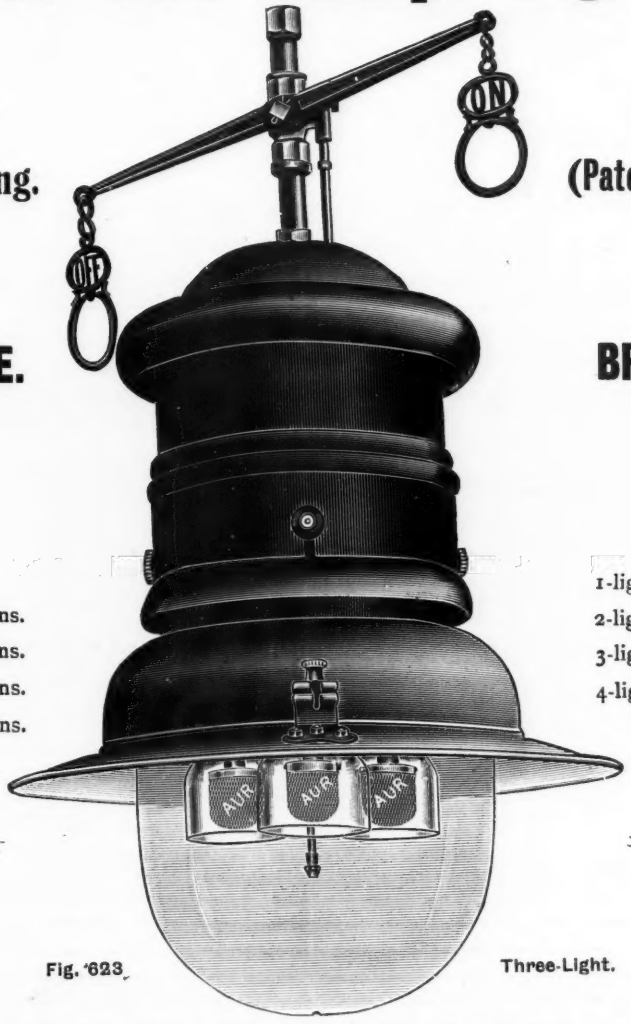


Fig. 623. Three-Light.

Height over all.

1-light . . .	1 ft. 8 ins.
2-light . . .	2 ft. 4 ins.
3-light . . .	2 ft. 4 ins.
4-light . . .	2 ft. 7 ins.

Width over all.

1-light . . .	1 ft. 1 in.
2-light . . .	1 ft. 5 ins.
3-light . . .	1 ft. 5 ins.
4-light . . .	1 ft. 8 ins.

ENAMELLED Green Steel Casing, fitted with Welsbach-Kern Inverted Burners, Gas and Air Regulators operated from outside. Sliding Door to give access to Burners for cleaning purposes. Fitted with Magnesia Nozzles, Welsbach Mantles, and Glass Mantle Protectors. Complete as shown. Highly efficient and regenerative.

	Gas per hour.	*C.P.*	*Steel.*	*Copper Case.*		*Gas per hour.*	*C.P.*	*Steel.*	*Copper Case.*
1-light	4 feet	125	**30/-**	**5/-** extra.	3-light	12 feet	400	**52/6**	**6/-** extra.
2-light	8 feet	260	**47/6**	**6/-** extra.	4-light	16 feet	550	**72/6**	**9/-** extra.

All on or off, or One light on and the rest off, **7/6** per Lamp extra. Cup and Ball, **3/6** per Lamp extra.

RENEWALS.

Glass Mantle Protectors (Fig. 623) **3/4½** per dozen, or in case lots of 5 gross, **33/-** per gross.

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*
Clear Glass Globes, each	**2/3**	**5/9**	**5/9**	**9/-**
„ „ „ In Case lots per dozen.	**19/6**	**57/9**	**57/9**	**93/-**
Case contains . .	*80*	*18*	*18*	*12*

	1-Light.	*2-Light.*	*3-Light.*	*4-Light.*
Wired Globes, extra each	**2/-**	**2/-**	**2/9**	**3/6**
Parabolic Reflector, extra „	**3/6**	**6/-**	**7/6**	Not made

Welsbach Mantles, each **6d.** subject as usual.

The Welsbach Mantles for Upright lighting are "C," "CX," and "Plaissetty," price **4½d.** each.

THE WELSBACH INCANDESCENT GAS LIGHT CO., LTD..

Welsbach House, 344-354, Gray's Inn Road, London, W.C.

Telegrams and Cables: "WELSBACH LONDON." *Telephone 2410 NORTH.*

THE WIGAN COAL & IRON CO., LIMTD.,

Are the exclusive Owners of the well-known HAIGH HALL & KIRKLESS HALL GAS COAL COLLIERIES, Wigan, and of the Manton Steam and House Coal Collieries, Worksop, Notts, and supply the well-known Wigan Arley Mine Gas Coal, Gas Nuts, Gas Cannel, Cannel Nuts, House and Steam Coals, &c.

MIDLAND AND WEST OF ENGLAND DISTRICT OFFICE: *6, CORPORATION STREET, BIRMINGHAM—Sole Agent: A. C. SCRIVENER.*
Telegraphic Address: "WIGAN, BIRMINGHAM." Telephone: No. 200.

LONDON DISTRICT OFFICE: *6, STRAND, LONDON—C. PARKER & SON, Sole Agents.* Telegraphic Address: "PARKER, LONDON."

Workmanship and Materials of the Highest Quality.

PECKETT'S LOCOMOTIVES.

Built to any Specification or Gauge.

PECKETT & SONS,
ATLAS LOCOMOTIVE WORKS, BRISTOL.

GEO. R. LOVE'S

INCLINES AT 45 DEGREES.

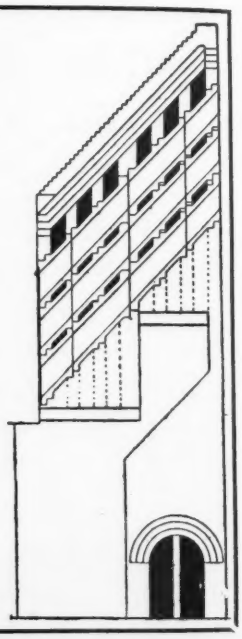
CARBONIZATION MADE EASY.

A Few Recommendations for this System:—

Simplicity of Design.
No **Machinery** to get out of order.
Carbonizing charges **40 per cent. less** than with Horizontals.
No skilled Stokers necessary.
Yield of Gas per ton guaranteed about 1000 cubic feet more than under present conditions, of guaranteed candle power.

Heats under absolute control throughout the whole length of the Retorts.
Saleable value of Coke greatly increased.
25 per cent. greater yield of Ammonia.
More liquid Tar.
Stopped Pipes unknown.

Naphthalene always in solution.
45 per cent. less ground space required.
Constructional cost per Ton carbonized considerably less than with Horizontal or Ordinary Inclined Retorts.
Several Installations in course of construction or completed.



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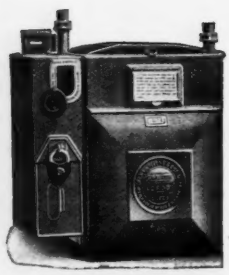
GOVERNORS, &c.



SLOT METER.

DRY METER.

JAMES MILNE & SON, LTD.,

EDINBURGH. LONDON. GLASGOW. LEEDS.

S. CUTLER & SONS, MILLWALL, LONDON.

And at 39, Victoria St., Westminster, S.W.

GASHOLDERS & STEEL TANKS

Carburetted Water Gas Plant.

DESSAU VERTICAL RETORTS.

Messrs. S. CUTLER & SONS are Contractors to the Vertical Gas Retort Syndicate, Ltd., for all Constructional Steel Work, Operating Gears, Fittings, &c., &c.

The DESSAU System has been adopted at 45 Gas-Works and up to the present date 3882 Retorts have been ordered.

WATER TUBE CONDENSERS. PURIFIERS.

OIL TANKS. ROOFS. GIRDERS.

Every Requirement for Gas-Works Supplied.

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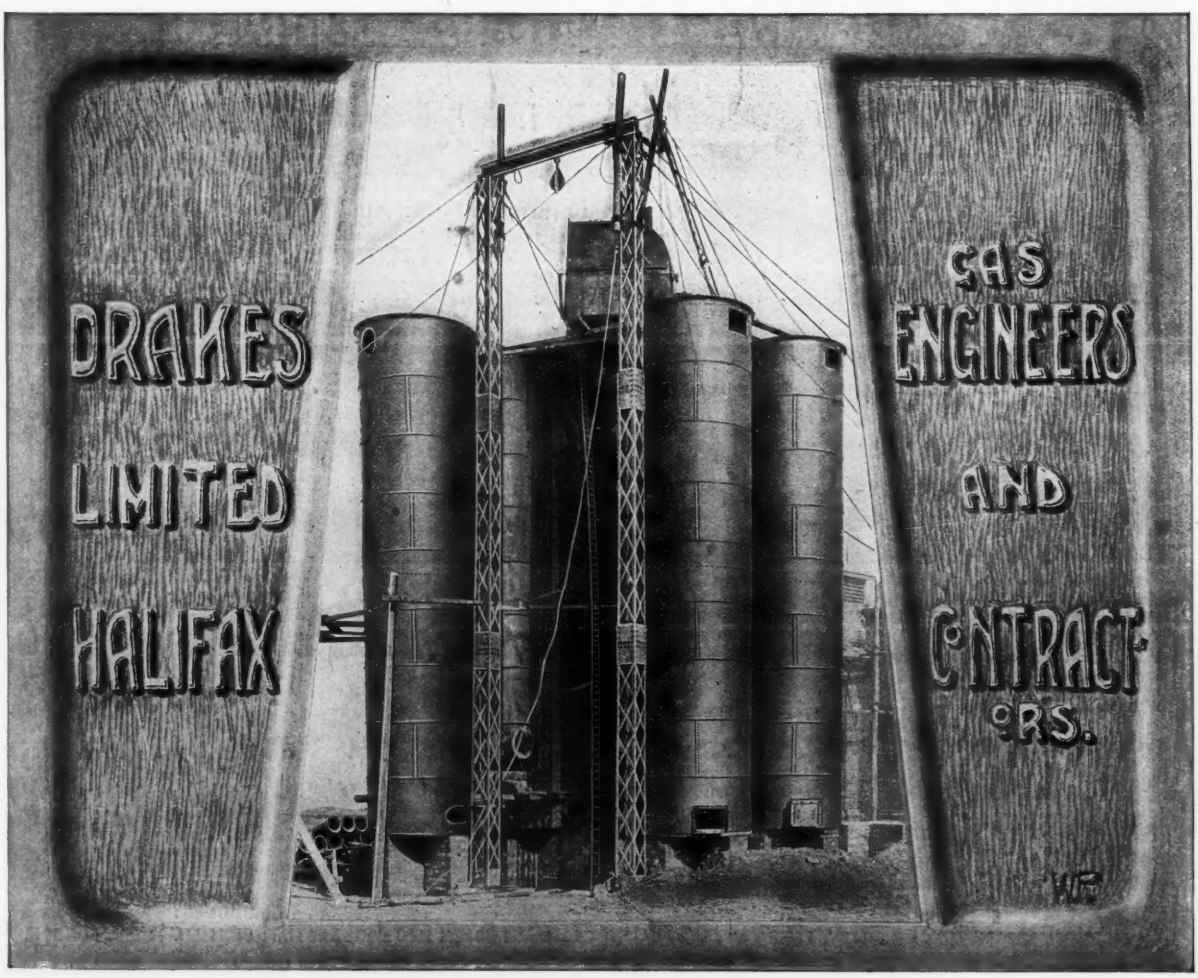

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IN

VERTICAL RETORTS

GLOVER-WEST PATENTS.

Extracts from Tests made by

Dr. HAROLD G. COLMAN

at the St. Helens Gas-Works.

DURHAM (THORNLEY) COAL.

Gas made per Ton	13,102	cubic feet.
Fuel Consumption	12·3	lbs. per cent.
Illuminating Power	15·56	No. 2 Met. Burner.
Calorific Value	573·6	B.Th.U. (Gross).

YORKSHIRE (SILKSTONE), BARROW COLLIERY.

Gas made per Ton	12,435	cubic feet.
Fuel Consumption	13·4	lbs. per cent.
Illuminating Power	16·19	No. 2 Met. Burner.
Calorific Value	584·9	B.Th.U. (Gross).

LANCASHIRE, WIGAN (ARLEY MINE).

Gas made per Ton	12,145	cubic feet.
Fuel Consumption	12·2	lbs. per cent.
Illuminating Power	15·22	No. 2 Met. Burner.
Calorific Value	576·2	B.Th.U. (Gross).

See "JOURNAL OF GAS LIGHTING," June 8 & July 20, 1909, for description and results.

For further Particulars, apply to—

WEST'S GAS IMPROVEMENT CO., LTD.,

Albion Ironworks, Miles Platting, MANCHESTER.

LONDON: 104, Queen Victoria Street, E.C.

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Printed and Published by WALTER KING, at No. 11, BOLT COURT, FLEET STREET, in the CITY OF LONDON.—Tuesday, Nov. 2, 1909.